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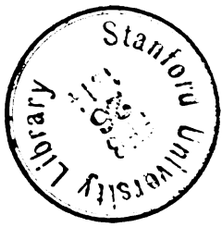

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THE

# Tramway & Railway World

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### COMMONWEALTH OF AUSTRALIA.

TENDERS FOR STEEL RAILS, ETC.

Tenders will be received until 11 a.m. on Tuesday, August 19, for the manufacture and delivery of Steel Rails, etc., for the Pine Creek to Katherine River Railway.

Forms of tender, specifications, etc., may be purchased at the office of the High Commissioner for Australia, 72, Victoria Street, S.W. The charge for specifications will be one guinea and for each copy of plans 5s., which must be paid at the Commonwealth Offices before the documents can be handed over.

Tenders must be endorsed "Tenders for Material for Pine Creek to Katherine River Railway," and be addressed to the Secretary, Department of Home Affairs, Melbourne. They must be accompanied by the deposit mentioned in the form of tender.

(Sgd.) JOSEPH COOK,
Minister of State for Home Affairs.

### CITY AND COUNTY BOROUGH OF BELFAST.

TRAMWAYS AND ELECTRICITY DEPARTMENT.

The Tramways and Electricity Committee of the Belfast Corporation are prepared to receive tenders for the supply of a

3,500 Ampere Traction Switchboard Panel.

Specification with form of contract may be obtained from Mr. T. W. Bloxam, City Electrical Engineer, East Bridge Street, Belfast, on deposit of one guinea for each specification. This deposit will be refunded, provided a *bonâ-fide* tender has been sent in, and not withdrawn.

Extra copies may be obtained at 10s. each which sum will not be returnable.

Sealed tenders, endorsed "Tender for Switchboard Panel," to be lodged in my office not later than 10 a.m. on Monday, July 21, 1913.

The lowest or any tender not necessarily accepted.

A tender, if sent by post, must be registered; if delivered by hand an official receipt must be obtained for it, otherwise the undersigned will not be responsible.

R. MEYER,
Town Clerk.

Belfast.

### CORPORATION OF NUNEATON.

The Electricity Committee is prepared to receive tenders for the supply, delivery, and erection of

One Line Booster.

Specification, form of tender, and full particulars may be obtained on application to the undersigned.

Sealed tenders, endorsed "Tender for Booster," and addressed to "The Chairman of the Electricity Committee," Electricity Works, Coton Road, Nuneaton, must be delivered not later than 9 a.m. on Tuesday, July 15, 1913.

The Committee does not bind itself to accept the lowest or any tender.

S. CAMERON GIBSON,
Borough Electrical Engineer.

Electricity Works, Nuneaton.

### COUNTY OF LONDON.

The London County Council invites tenders for the purchase of Two 3,500 kw. Steam Generators, 6,600 volts, 25 periods per second, each set consisting of two Engines, one on each side of the Alternator, complete with Condenser and Air Pump.

Particulars and forms of tender for the purchase of all or any of the machinery may be obtained upon application, personally or by letter, to the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

Tenders must be upon the official forms, and the instructions therein must be strictly complied with. No tender received after 11 a.m. on Tuesday, July 15, 1913, will be considered.

The Council does not bind itself to accept the highest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
June 28, 1913.

### COUNTY OF LONDON.

The London County Council invites tenders for the supply of 5 miles of 4/0 Grooved Trolley Wire.

Full particulars of the material required, form of tender, and conditions of contract, etc., may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

The contractor will be bound to pay to all workmen employed by him in and about the execution of the contract, or any part thereof, wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list, and such rates of wages and hours of labour will be inserted in and form part of the contract by way of schedule. Full particulars of the Council's Standing Orders on these matters are given in the *London County Council Gazette*. Tenders must be upon the official forms and the instructions therein must be strictly complied with. No tender received after 11 a.m. on Tuesday, July 15, 1913, will be considered.

The Council does not bind itself to accept the lowest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
July 2, 1913.

### COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

The Newport Corporation invite tenders for Additional Extra High Tension Switchgear.

Specifications, schedules, drawings, and form of tender, together with any further information that may be required, can be obtained from Mr. A. Nichols Moore, M.I.E.E., Borough Electrical Engineer, Town Hall, Newport, Mon., on and after Saturday, July 5, upon production of the receipt of the Borough Treasurer for the sum of 10s. 6d., which sum will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Additional E.H.T. Switchgear," addressed to the undersigned, are to be delivered either by hand or through the post not later than 10 a.m. on Saturday, July 19, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

Contractors will be required to pay the recognised rates of wages and observe the recognised hours and rules of labour in the district.

ALBERT A NEWMAN,
Town Clerk.

Town Hall, Newport, Mon.,
July 1, 1913

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### LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply :—

1. Switches and Crossings.
2. Railway Wagons.
3. Wheels and Axles.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Thursday, July 17, 1913, for No. 1, and on Tuesday, July 22, 1913, for Nos. 2 and 3, after which times respectively no tender will be received.

H. J. W. Fry,
Director-General of Stores.

India Office, Whitehall,
July 2, 1913.

### COUNTY BOROUGH OF SUNDERLAND.

OILSKINS.

The Corporation of Sunderland are prepared to receive tenders for and samples of Oilskins for Motormen.

Further particulars may be obtained on application to the General Manager, Tramways Offices, Monkwearmouth, Sunderland.

Tenders, in sealed envelopes, endorsed "Tender for Oilskins," addressed to the Chairman of the Tramways Committee, Town Hall, Sunderland, together with samples, must be delivered at my office not later than 12 o'clock noon on Thursday, the 31st day of July next.

The Corporation do not bind themselves to accept the lowest or any tender.

H. Craven,
Town Clerk.

Town Hall, Sunderland,
June 30, 1913.

### COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply and laying of :—

A. Single Low Tension Paper Lead Cables.
B. Pilot and Telephone Cables.

Specification and form of tender can be obtained from the undersigned after Tuesday, July 8, 1913.

Sealed tenders, endorsed "Tramway Feeder Cables," must be delivered to Higson Simpson, Esq., Town Clerk, Church Street, West Hartlepool, not later than noon on Monday, July 21.

The Corporation do not bind themselves to accept the lowest or any tender.

Chas. Burgess,
General Manager.

Tramway Depôt,
Greenland, West Hartlepool,
July 3, 1913.

(*Continued on page 7.*)

**TRAMWAY SUPPLIES, Ltd.,**
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FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
# Tramway AND Railway World

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SATURDAY, JULY 5, 1913.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

## SPLIT-SHIFT ABOLITION SCHEME.

While it is correct that the general manager of the Hull Corporation tramways has drawn up a plan, outlined in our last issue, for abolishing in that city split turns of duty, a published summary of Mr. McCombe's report which reached us led to a misunderstanding regarding his view of the men's suggestion that the hours of labour be reduced from 54 to 51 per week. Mr. McCombe did not recommend so sweeping a concession as that would prove to be from the aspect of its financial effect on the undertaking and the position in which the employees stand when compared to those of many other tramways. Indeed the Hull men are in danger of being surfeited. Their conditions are already exceptionally favourable, but they are even yet unsatisfied and, prior to this concession, proposed to keep up an unceasing agitation. The request for a 51-hour week is in pursuance of this policy, and because the Committee offered them 53½ hours instead of 54, and an interval of two hours for tea, they not only objected to the proposal but indulged in talk concerning "strong measures." Nearly five months have elapsed since that midnight assembly, and the grumblers have no doubt come to the conclusion that they are too well off to risk the loss of their situations, for there are many applicants for vacancies. Only last year they received concessions involving an outlay of £1,250 per annum, and the Committee are thoroughly justified in refusing to incur the further expenditure of £2,000 required to give a 51-hour week. Apparently Glasgow is the only place where those hours prevail, but the Hull men's labours are certainly not so exacting as is the case in the Scottish city, and according to the deputy chairman of the Hull Tramways Committee the minimum and maximum wages are higher in Hull. Moreover, there are over fifty municipalities where the employees work from 54 to 65 hours a week. As recently as December last Alderman Jackson, of Salford, general secretary of the union, wrote:—"I should only be too delighted if we could establish a general 54-hours' week, as you have, throughout the whole country for the time being; but with so many towns working 60 hours, it would be almost impossible to make out a case for an eight-hour day that would carry the support of the Council and the public of Hull." The present proposal for the abolition of the split shift offered to the men is a great step in advance of the men's proposals, and Mr. McCombe deserves credit for the ingenuity with which he seeks to achieve the desirable purpose of giving a shorter spread over of time, thus allowing them more leisure. It is satisfactory to learn that they have thanked the Committee for the consideration given to their case, and have expressed high appreciation of the manager's scheme. Under its operation they will as far as possible be given an early week and a late week alternately. Whether the plan of combining the duties of motorman and car washer and conductor and car washer works successfully will depend upon how new applicants for employment regard the joint task at a higher rate of pay. The thanks now expressed by the old hands would be regarded as being more sincere if these men had offered to take service under the new conditions.

## RAILLESS TRACTION AND ROAD MAINTENANCE.

The question whether the promoters of railless traction schemes should be called upon to contribute to the cost of maintaining the roads over which the trackless cars run has been debated on several Bills before Select Committees during this session of Parliament. Various agreements by no means uniform in character have been reached. In some cases promoters are to pay three-eighths of a penny per mile run, and in others any special wear caused by the cars is to be assessed by arbitration. The most recent case to be settled, however, raised the point in a specially direct form, and no agreement was reached beween the promoters and the road authorities. The Western Valleys (Monmouth) Railless Traction Bill was the measure in question, and a Committee of the House of Commons decided that the company promoting the Bill should pay three-eighths of a penny per mile run, but this is not to apply to workmen's cars, on which specially low fares are charged. By giving this direct decision the Committee have carried the practice of Parliament a step further, because previous Committees, recognising the necessity for general legislation on the subject, had succeeded in getting the parties to come to agreements and thus the Committees avoided giving direct decisions. The effect of the finding in the Western Valleys case on the proposed undertaking is hard to forecast. There will be some eight miles of route connecting various towns and villages with a total population of about 60,000. The company are going to provide their own generating station, and this explains the fact that the capital expenditure on the whole undertaking is estimated at some £70,000. It has been proposed that there should be a 7½-minute service for 16 hours a day. That would mean a very considerable mileage run per annum, and a correspondingly large payment to the road authorities. As the whole question is only in the early experimental stage, it is possible for a wide variety of opinions to be held on the subject. In that connection it may be noted that the promoters offered to pay one-farthing per mile run, while some of the local authorities wanted five-eighths of a penny.

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What is certain, in a matter of so much uncertainty, is that the contribution payable by the company, if fixed at all, should have been fixed for only a limited period—say two or three years—and that then the matter should be open for a fresh settlement in the light of experience. Even when experience has been got in one place, that will not be a guide for others, because roads in some localities are much more solidly constructed or laid with better materials than in others. That will affect the question of how much wear is caused by trackless cars. Beyond all this, there is the question of the automobile omnibus which may be run by companies anywhere free from any contribution to road maintenance. It is perfectly clear that Parliament cannot go on placing burdens on the trackless trolley system and leaving the omnibus to go free. The whole subject merits careful and general consideration, first by experts and then by Parliament.

## THE COMMERCIAL MOTOR VEHICLE EXHIBITION.

In connection with the above, which opens at Olympia on July 18, a dinner was given at the Grand Hotel, Charing Cross, on Thursday last by the Society of Motor Manufacturers and Traders, with Mr. S. F. Edge, the president of the Society, in the chair. A company of over 100 guests assembled, and these included among others Lieut.-Colonel A. F. Mulliner, E. M. C. Inston (Daimler Company), vice-president, F. W. Shorland (Clement Talbot), S. Straker (Sidney Straker and Squire, Limited), chairman of Commercial Vehicle Committee, Raymond Dennis (Dennis Bros., Limited), R. Barry Cole (Commercial Cars, Limited), F. Churchill (J. and E. Hall, Limited), W. Dewiss (Milnes-Daimler), J. Maughfling (Thornycroft and Co., Limited), A. Spurrier (Leyland Motors, Limited), Chas. Jarrott (Jarrott and Letts, Limited), A. S. Mays-Smith (Delaunay Belleville, Limited), P. Liversidge (Liversidge Bros., Limited), H. Smith (Rover Company, Limited), J. D. Siddeley (Deasy Motor Car Company, Limited), D. Citroen (Minerva Motors, Limited), A. Brown (Brown Bros.), H. A. Blackie (Exhibition manager), C. D. Clayton (Press manager), and T. F. Woodfine (secretary of the S.M.M. and T.).

In proposing the toast, "The Exhibition," Mr. Shrapnell Smith referred to the great progress mechanical road traction had made during the past five years, and said he felt confident that the display that would be made at Olympia in two weeks' time, coupled with the fact that the railway companies had raised their transport rates some 4 per cent., would result in a very large increase in the number of motor vehicle users in all parts of the country.

Responding to this toast, Mr. Straker said that everything possible had been done to make the forthcoming show a success, and they had every reason to hope that it would prove to be the finest exhibition of industrial motor vehicles that had ever been held. In response to the society's invitations, municipal authorities from all parts of the world had arranged to visit the exhibition.

The Chairman proposed the toast of "Our Guests," and reminded the company that the use of motor vehicles not only economically replaced horses, but meant increased trade. In London alone £35,000,000 was paid annually for haulage, and although a considerable portion of this was now earned by horses, in the comparatively near future there could be no question but that the bulk of it would pass to the motor vehicle.

## TROLLEY WIRE COPYRIGHT ACTION.

At the Lancashire Chancery Court, Liverpool, on June 24-26, the British Insulated and Helsby Cables, Limited, claimed damages against the London Electric Wire Company and Smiths, Limited, of Anaconda Works, Salford, for an alleged infringement of their registered designs for overhead trolley wire for electric tramways, and they asked for an injunction to restrain the defendants from further infringements of their copyright.

Evidence was called for the plaintiffs to the effect that the defendants sold, or offered for sale, trolley wire to the Corporations of Halifax and Wallasey which had been made in accordance with, or was an alleged obvious or fraudulent imitation of, the plaintiffs' designs.

One of the representatives of the plaintiff company stated that 35 corporations in this country had been supplied with plaintiffs' wires, and that they had also supplied South Africa and Australia in large quantities.

Mr. W. M. Mordey, electrical engineer, Westminster, said in his opinion the wires supplied by the defendant company were an infringement on the plaintiffs' designs. The wires of the plaintiff company surmounted in the fullest degree the difficulties previously experienced in relation to the attachment of the trolley wires to their overhead support.

Witnesses were called for the defendants, who contended that the designs which the plaintiffs claim as their copyright were anticipated, and that they were neither novel nor original. Judgment was reserved.

## BIRMINGHAM AND THROUGH ROUTES.

Consideration was given on July 1 by Birmingham Corporation to the Tramways Committee's scheme for the linking up of the various tramway routes by means of lines through the central area of the city. The scheme was divided into thirteen sections. Two parts met with the disapproval of the majority of the members, the proposal to link up Broad Street with Colmore Row *viâ* Victoria Square being referred back to the Tramways Committee to prepare a scheme that will avoid Victoria Square, and the suggestion to connect Navigation Street with Corporation Street *viâ* Stephenson Street being rejected by a large majority. All the other proposals, including that for a double line of tramways along Broad Street, were approved. Councillor Harrison Barrow, chairman of the committee, emphasised the dislike the public had to being taken round back-street routes. A minute or two, he said, made a great deal of difference to people travelling on the cars, and as they had found in the case of the Ladywood terminus, often turned profit into loss. Councillors Neville Chamberlain and Cowbridge, the chief opponents, urged that the tramways could only go on making money whilst they had a monopoly of the routes. Their only security was whether the Watch Committee would or would not give competitors powers to run along the streets. Councillor Harrison Barrow declined to enter into a discussion on the merits of motor 'buses and tramways, but pointed out that the returns of the London General Omnibus Company for the six months ended December 31 showed that their expenses ratio had gone up from 81 per cent. to 92 per cent., so that the motor omnibuses were not having it all their own way in London.

## L.C.C. TRAMWAY MATTERS.

SPECIAL CARS FOR SPECIAL PURPOSES.

At last Tuesday's meeting of the London County Council the Highways Committee in their report referred to the subject of by-laws made by the Board of Trade early last year relating to the use of special cars for special purposes. These by-laws contained no provision for the imposition of a penalty for their contravention, and powers to enable this to be done were accordingly obtained in the Council's Tramways Act, 1912. The by-laws had been amended to provide for the imposition of a penalty, and the Committee now presented them in the form in which they understood that the Board of Trade would be prepared to make them. The Committee accordingly recommended that the Board of Trade be asked to make by-laws providing among other things that no male person shall, unless duly authorised by the Council, mount any tramcar which is run and reserved for female persons only; that in any case in which the car is reserved for any special purpose, which shall be indicated by a conspicuous notice, no person other than a person for whose convenience such tramcar is reserved shall mount such tramcar; and that any person offending against these by-laws shall be liable to a penalty not exceeding 40s.

TENDERS FOR CABLES.

The Committee had considered the following tenders for the supply of high and low tension electric cables required in connection with the construction of further portions of the tramways, and also for maintenance purposes during the current year :—

| | £ s. d. |
|---|---|
| Western Electric Co. ... ... ... ... ... | 25,409 16 8 |
| Johnson and Phillips ... ... ... ... ... | 26,018 3 5 |
| Siemens Bros. and Co. ... ... ... ... | 26,169 0 11 |
| W. T. Henley's Telegraph Works Co. ... ... | 26,187 10 3 |
| Callender's Cable and Construction Co. ... | 26,941 18 2 |
| W. T. Glover and Co. ... ... ... ... | 27,201 5 4 |
| British Insulated and Helsby Cables ... ... | 27,837 11 9 |

The estimate of the chief officer was £24,000. That estimate was prepared from the details contained in recent tenders, but it appeared that the market price of cables had risen somewhat since. In all the circumstances the Committee were of opinion that the tender of the Western Electric Company was a favourable one, and they recommended its acceptance.

CONDITIONS OF EMPLOYMENT.

The Rolling Stock Sectional Conciliation Board had considered an application by armature winders that their pay should be increased from 9½d. to 10½d. an hour, and had agreed to a settlement on the basis of 10d. an hour. The Committee recommended that this agreement should be accepted. The cost would amount to about £101 10s. for the remainder of the current financial year, and to £185 during the year 1914-15.

Under the terms of an agreement arrived at on May 31, 1911, by the Central Conciliation Board, and approved by the Council on July 4 following, shunters and traversemen were allowed a uniform consisting of a jacket and cap annually. The employees' representatives at a meeting of the Sectional Board on June 5 proposed that these men should be supplied with additional uniform. The Committee had now arranged for them to be furnished with an overcoat once in every two years. The number of men affected was 52, and the cost would amount to about £60 every two years.

ARRANGEMENTS FOR THROUGH RUNNING.

The Committee were advised that owing to the large number of cars now being fitted with trolleys and plough collector gear for through running and other purposes, it would be necessary to obtain 1,000 ordinary leads and 3,500 sliding contact leads. It was proposed that tenders should be invited from selected firms.

The various proposals were adopted.

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## MISCELLANEOUS NEWS AND NOTES.

**Cost of the Brighton Railless Traction Bill.**—The sum of £3,000 was expended in obtaining the Brighton Corporation Act which gives powers to operate railless trolley cars and motor omnibuses.

**Extension of Halfpenny Fares at Leeds.**—On the recommendation of the Tramways Committee the Corporation on July 2 agreed to the introduction of halfpenny fares on routes where they are not at present in force.

**L.C.C. Tramways and Traffic Inducement.**—On the occasion of the London Fire Brigade review at Peckham Rye, the County Council's tramway department issued 20,000 special circulars calling attention to the tramway facilities.

**Success of P.A.Y.E. Cars.**—Aberdeen tramway traffic returns for the week ended June 25 show an increase in the revenue on the new P.A.Y.E. cars on the Woodside route of £11 10s. 2½d., and for the past eight weeks since the introduction of the new vehicles £226 10s. 1d.

**Tramways Exhibit for Lyons Exhibition.**—Glasgow Tramways Committee have instructed the general manager to arrange for a model of a car and diagrams describing the work of the department being prepared for the International Exhibition to be held at Lyons next year.

**Running Powers for a Company in Sunderland.**—Provided they have power to do so the Tramways Committee have agreed to grant the request of the Sunderland District Tramways Company for running powers over the Corporation's line from Grangetown to the centre of the town.

**Two Women Saved by a Lifeguard.**—Three women who were walking arm-in-arm stepped off an island footpath on Blackpool Promenade on June 30th in front of a tramcar. They were knocked down, but two were picked up by the lifeguard of the car. All three were taken to the hospital.

**Biograph Illustrations of Street Car Accidents.**—The Chicago Railways Co. have obtained a reel of 1,000ft. of film showing 40 scenes of different types of street car accidents. This film will be exhibited before the employees of the company, also before school children and the public generally, at schools and on street screens.

**Self-Propelled Cars for an Edinburgh Line.**—While declining the terms offered by the Colinton Tramways Company for the sale of their tramway to the city, the Edinburgh Corporation have directed the Tramways Committee to report upon any other offer that may be made by the company or the War Office. The latter desire the line to be extended to Redford Barracks, and the company had agreed to run self-propelled cars from Tollcross to Colinton.

**Light Railways Order.**—The Board of Trade have confirmed the under-mentioned Order made by the Light Railway Commissioners:—Glamorgan County Council (Morriston to Pontardawe) Light Railways (Revival as to part) Order, 1913, reviving the powers granted by the Glamorgan County Council (Morriston to Pontardawe) Light Railways Order, 1903, in relation to part of the railway and works thereby authorised, and for other purposes.

**Tramways to be Let on Lease.**—It is reported that the Barking Urban Council Tramways produced a loss of £7,200 for the year ended March 31st, following a loss of £5,000 for the preceding year. The chairman of the Council attributes the loss to the competition of the motor-omnibuses, competition with the municipal tramways in West Ham, East Ham, and Ilford, and the absence of inter-running with Ilford owing to the high terms demanded by Ilford Council. "Our only hope," he says, "is to let the tramways on lease to someone." For the electricity undertaking he states there is some hope.

**The Difficulty at Oxford.**—As the result of an interview with Mr. Cownie, of the National Electric Construction Company, the Tramways Committee have decided to recommend the acceptance of a scheme for running petrol-electric tramcars in High Street, Cornmarket Street and Queen Street, overhead trolley tramcars in the outskirts of the city, and motor-omnibuses on the routes now served by horse 'buses, with the exception of the Iffley Road route, on which it is proposed to have the overhead system. The scheme also includes the substitution of motor-omnibuses for tramways down St. Aldates.

**Effect of Turbine Machinery at Rotherham.**—Mr. E. Cross, the electrical engineer, in his report for the year ended March 31, draws attention to the reduction in the cost of operation, as against any figure that had hitherto obtained, particularly when the high cost of fuel and the increased cost of materials generally are taken into consideration. The cost of generation, .541d. per unit, he considers as distinctly good when compared with the results obtained by towns of a similar character to Rotherham. The reduction in costs is due to the increasing power load, and the adoption of turbine machinery instead of continuing with reciprocating plant.

**Croydon Corporation and Motor-Omnibuses.**—At a meeting of the Croydon Council held on June 30th, on the recommendation of the Tramways Committee the following resolution was unanimously adopted: "With reference to the motor-omnibus traffic in the borough, the Committee recommend that the Government be urged to pass such legislation as will place the motor-omnibus companies on terms of equality with regard to public obligations with the municipal tramways authorities in the Metropolitan area, and that a communication be addressed to he Prime Minister, the President of the Board of Trade, and the Member for the borough, upon the subject."

**Economy Effected by Modern Plant.**—In a report presented to the Tramways Committee, the manager of the Reading tramways says:—"The automatic reversible booster and battery were put into operation on April 25, and have worked daily and a distinct saving in coal has resulted. With the reduced number of engines running per day, and the shorter period of running, two engine drivers are able to do the work for which three men were previously needed, resulting in a saving of £83 4s. per annum. The first chain grate stoker was put to work on May 21, and the boiler equipped with it is generating the total steam required in the power station, and so far the smokeless working guaranteed by the contractors has been attained."

**Interference with a Manager Deprecated.**—Several members of Belfast Corporation on June 30 raised questions concerning the tramway service on several routes, and an amendment instructing the Committee to provide for six months a reasonable service on the Glengormley section was lost by 19 votes to 18. Mr. Nance, the general manager, had stated that there had been a former service on this route, and that the proposal would mean a loss of 7d. per car mile. In regard to another route, Alderman Doran deprecated interference with the management which on a previous occasion had almost ruined the undertaking. They should let the manager alone. Alderman Sir Robert Anderson said that the manager had informed him that he would look into the matter.

**Bristol Tramways Company's New Motor Works.**—On July 1 and 2 large parties of shareholders inspected the new Brislington motor works. Sir George White, Bart. (chairman), Mr. Samuel White (managing director), Mr. Hugh G. Doggett and Mr. G. Stanley White (directors), Mr. H. F. Cooper (secretary), Mr. C. Challenger (manager), Mr. S. E. Smith (assistant manager), and Mr. G. T. Edwards (engineer) were present to receive the guests, who were shown over the extensive works, which cover an area of 4½ acres. The visitors, on leaving, expressed great satisfaction at the development of the latest department of the company's business, and were pleased with the manner in which the building operations had been carried out, under the supervision of the company's engineer (Mr. G. T. C. Edwards), and the planning of the various shops by Mr. Scrise, consulting engineer.

**Visit to Hadfield's Steel Foundry.**—In connection with the International Road Congress, a large party paid a visit on June 30th to Hadfield's Steel Works at Sheffield, and were received by Sir Robert Hadfield, Mr. A. M. Jack, J.P., the managing director, and other members of the board. The production at the works has grown to such an extent during the past few years that the total workshop area now covers some 25 acres, the total area of the works being about 100 acres, round which some 25 miles of rail track is laid. The employees number some 6,000. Various stone-crushing machines were inspected, and the track-work department proved of considerable interest. It embraces both simple and complicated junctions, crossovers and layouts for railway and tramway work. Several acres of flooring are reserved for putting component sections together, and to ensure exact assembling on the site. Other departments inspected were those devoted to the machine shop, foundry, wagon, laboratories, and armour-piercing projectiles.

## PERSONAL.

**Mr. I. Bulfin,** general manager of Bournemouth Corporation tramways, has been granted an advance in his salary to £700.

**Mr. H. H. Couzens,** late of Hampstead electricity works, took over the charge of the new hydro-electric installation at Toronto on July 1.

**Mr. W. M. Nelson** has resigned his appointment as engineer to the Christchurch (N.Z.) tramways, and rejoined the Brisbane Tramways Company.

**Lieut.-Colonel F. G. Von Donop,** R.E., has been appointed Chief Inspecting Officer of Railways, in succession to Colonel Sir Arthur Yorke, R.E., C.B., who has retired under the age limit.

**Captain T. C. FitzHugh,** M.V.O., the Chief Commissioner in the Far East, recently appointed by the British Engineers' Association, has left London for Peking accompanied by his technical secretary, Mr. L. B. Stevens.

**Mr. A. Murdock,** electrical and tramways engineer to the Melbourne City tramways, has returned to England on leave and is staying at Blackpool, where he was formerly on the staff of the Corporation electricity works.

**Mr. W. Wyld** has been presented with a silver salver from the chief officers of Birkenhead Corporation on resigning his appointment as tramways manager and electrical engineer to become electrical engineer to Hampstead Council.

**A Southampton Vacancy.**—The Corporation have decided to appoint a general manager to take the entire control of the tramways undertaking, at an initial salary of £400 per annum, in order to enable Mr. H. F. Street to devote his whole attention to the electricity department.

**Mr. P. H. Marco,** general manager, Barnsley and District Tramways Company, presided at the annual dinner given by the company to the employees. Alderman Rose, who proposed the toast of the Tramway Company, said it was to the untiring efforts of Mr. Marco that the present position of the company was due. He had grappled with a very difficult period and brought about great improvements. Mr Marco, in response, expressed the regret of his chairman (Mr. E. Garcke), and directors (Colonel Sir Thos. Pilkington, Bart., and Mr. E. A. Paris) at their inability to attend. Although nearly twenty million passengers had been carried, and about two million miles had been run, they had not had a fatal accident, and he gave the staff the whole of the credit for doing their work so thoroughly and so well. He fully appreciated the fine work of his departmental officers—viz., Mr. A. Wood, traffic superintendent; Mr. A. Kenworthy, department superintendent; Mr. J. Cocking, chief clerk; and Mr. McFayden, permanent way superintendent. Mr. Marco also expressed his gratification at the

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employees having won the Lansdowne "Devonshire Challenge Cup" for the best health record amongst the thirty or forty associated companies of the Federation, three times in four years.

**West Ham Tramways Managership.**—The appointment of manager of the Corporation tramways will be made on Tuesday next, when Messrs. A. Coveney (Erith), J. S. Moffet (Rochdale), and R. S. Pilcher (Aberdeen) will be interviewed. These selections were made by the Tramways Committee out of eight candidates who attended their meeting on July 1.

**Mr. Butler** has been appointed engineer of tracks and tramways to the Government of Tasmania. At an inquiry held at Launceston on May 21 by the Minister of Lands and Works into applications for tramway improvements, the Minister said there had been some difficulty with the Public Service Board in creating the new office. The department's trouble was that they had more work than they had engineers for. It would take the engineer some time to organise his department.

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**Mr. J. Armitage,** an inspector of the Huddersfield tramways, died on June 26 from injuries received by being knocked down by a motor wagon while on duty. At the funeral on June 28, Mr. R. H. Wilkinson, the tramways manager, and a large number of the employees attended.

## CONTRACTS AND ORDERS.

**Dick, Kerr and Co.** have obtained a contract for permanent way renewals in connection with Belfast Corporation tramways.

**Bolton Council** have accepted the tender of Newton, Chambers and Co., Limited, for feed tanks, and that of Musgrave and Co., conditionally, for condensing plant.

**Wm. Airey and Son** have been awarded the contract for the erection of a tramways depôt, workshop offices, and a club for employees in Sovereign Street by Leeds Corporation.

**British Thomson-Houston Company** have been awarded the contract for the supply of two 300 kw. rotary converters, with transformer switchgear, traction feeder, etc., to West Hartlepool electricity works.

**The Peckham Truck Company,** of Queen Anne's Chambers, Westminster, have recently received orders for two of their long wheel base radial trucks from the Liverpool Corporation tramways, for use with the Mellins improved double-decked cars.

**London County Council** have accepted the following tenders:—Western Electric Company, high and low tension electric cables, £25,409 16s. 8d.; Hadfield's Steel Foundry Company, steel and iron castings for permanent way during the year ending April 30, 1914, £144.

**Stalybridge Joint Tramways Board** have accepted the following tenders in connection with the extensions to the generating station:—Economisers, Goodbrand and Co.; supply and erection of steel work for boiler house, Ed. Wood and Co.; feed water heater, Messrs Babcock and Wilcox; weigh bridge, Ellis and Son.

**Salford Council** have accepted the following tenders:—Brush Electrical Engineering Company, Limited, one double-deck, single-truck car body, with vestibule ends, £530, nine additional car bodies of a similar character at the price of £500 per car body, subject to a reduction of £30 per car body if after the experimental period has elapsed it is decided to have the nine car bodies without the vestibule ends; J. G. Brill and Co., ten tramcar trucks, less wheels and axles, £548; Walter Scott, Limited, 1,000 tons of Sandberg steel tramway rails, at £7 7s. 6d. per ton.

## FINANCIAL REPORTS AND MEETINGS.

**Provincial Tramways Company.**—The board have declared an interim dividend of 8d. per share on the ordinary shares for the past half-year.

**Mexico Tramways.**—The directors have declared a dividend of 1¾ per cent. on the issued capital stock of the company, payable August 1 to shareholders of record July 12.

**Dublin United Tramways Dividend.**—Ad interim dividends at the rate of 6 per cent. per annum, less income tax, on the preference shares, and at the rate of 6 per cent. per annum, less income tax, on the ordinary shares for the half-year to June 30th have been declared.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended June 27 amounted to £39,289. Upon such of the lines as were working both last year and this year the receipts show an increase of £2,729 upon the week.

**General Electric Company's Dividends.**—The directors recommend the following appropriations out of the balance of £124,890 for the year ended March 31st:—Managing director's and employees' bonus, £9,284; expenses of new issue of preference shares, £10,275; dividend on ordinary shares at the rate of 10 per cent. for year, £40,000; reserve account, £30,000; condtional appropriation to staff benevolence, £3,000, carrying forward £32,331.

**The Railless Trolley Service at Bradford.**—The railless trolley car installation on the outskirts of Bradford produced an income for the year ended March 31 of £1,233, representing 7d. per car mile; while the expenditure (£1,613) represented 9d. per car mile. There was therefore a deficit of £380, or of 2d. per car mile run. It is pointed out, however, by the City Treasurer that the railless section is a feeder of the general tramways system and contributes to some extent to its profits.

**Power Station Improvements for Norwich.**—Baron d'Erlanger, presiding at the annual meeting of the New General Traction Company, stated that owing to the increased cost of fuel, the directors had decided to take advantage of the improvements in the generation of electric power which had been developed since the erection of the power station of the Norwich tramways in 1899, and they therefore proposed to instal a steam turbine and a generator of 500 kw. capacity. They also proposed fitting the boilers with superheaters and mechanical stokers. It was anticipated that these changes would save approximately £2,000 a year in working expenses. During the year they had paid off the whole of the prior lien debentures of the floating debt owed by the New General Traction Company, and had reduced the five per cent. mortgage debentures to £158,300. The profits of the company were now derived from the American Company, the Douglas tramways, and the Norwich tramways. A dividend of 4 per cent. was ordered to be paid.

**Stalybridge Joint Tramways Loss: Heavy Motors and Track Repair.**—It was reported at a meeting of the Stalybridge, Hyde, Mossley, and Dukinfield Joint Tramways and Electricity Board on June 26 that the loss on the year's working was £9,124, or £2,000 more than in the preceding year. Alderman Wood (Stalybridge), in moving the Tramways Committee minutes, said they had not much to congratulate themselves about in the way of revenue, but of course, they knew that they had been stopped for a short time, when they did not even earn interest and sinking fund. In 1905 they earned 6.67d. per car mile; the following year 6.04d. per mile, and last year 7.88d. On track and overhead equipment they spent £2,000. He did not necessarily mean the rails, but the pavement also, and at the Municipal Tramways Association meeting a resolution was passed asking Parliament to do something in the way of asking the owners of commercial motors who carted heavy loads to pay something for the upkeep of the roads. If three-eighths of a penny per mile could be collected from the owners of these vehicles it would go a long way towards maintaining the roads. Councillor Fowden observed that notwithstanding that the tramways were losing heavily the electricity department had seen fit to increase the price of current to the tramways. This increase amounted to about £1,300 per year. It was decided to issue precepts on the four authorities for the amount of the deficiency.

**The Imperial Tramways Company.**—The directors report that the scheme of arrangement which was approved by both classes of shareholders, has received the sanction of the High Court. Accordingly the arrears of dividend on the preference shares to December 31, 1911, have been cancelled, and ordinary shareholders have relinquished their exclusive rights in the ordinary shares dividend fund, which will in future form part of the dividends equalisation fund applicable to maintenance of dividends on both preference and ordinary capital. The investment in the London United Company has been written down, and the sum of £85,000 has been transferred from the reserve fund for renewals and contingencies for that purpose, leaving the present amount of the reserve funds at £65,122. The directors state that in their opinion the shareholders may now look for the regular payment of preference dividend and the maintenance of at least 4 per cent. on ordinary share capital. The revenue account shows an available amount of £24,255, and after payment of interest on debenture stock for the whole year there is a balance, including £7,678 brought forward, of £10,221, which the directors recommend should be appropriated as follows:—Dividend at 6 per cent. for the year on preference capital (less income-tax), £11,300; dividend at 4 per cent. for the year on ordinary capital (less income-tax), £7,533; and to carry forward £388. A portion of the investment in the London United Tramways, Limited, has been disposed of, 20,000 shares out of the 44,446 £10 preference shares having been sold. The permanent way of the Middlesbrough, Stockton, and Thornaby tramways has been further renewed, so that two-thirds of the track has been re-laid. The re-construction of the remainder will probably be completed this summer.

**Bradford Corporation Tramways.**—The extension of the period during which halfpenny fare facilities are given is stated to be mainly responsible for the reduction in the net profit on the tramway undertaking in the City Treasurer's balance-sheet for the year ended March 31. The net profits amounted to £41,921, as compared with £52,782 for the preceding year. The traffic income (£270,524) showed an increase of £6,044, but as there had been an increase in the mileage run amounting to 271,000 car miles the income per car mile worked out at a lower figure than in the previous year—11.3d. as compared with 11.6d. Wages of drivers and conductors accounted for an increase of £4,456, of which £2,000 was in respect of advances of wages and £2,500 in respect of increased staff consequent on the additional mileage. £12,800 was paid in rates—£1,300 more. Repairs and maintenance cost £42,900, an increase of £7,000. Permanent way repairs went up by £3,550, and car repairs by £2,900. Electric power cost £46,000, the larger mileage run being responsible for an increase of £2,000. Per car mile the cost of power worked out at 1¾d. From the parcels department there was an income of £9,500, an increase on the year of £1,200. The expenditure of the department was larger by £1,100, and the profit (£1,067) showed an improvement on the year of £136. As a whole the undertaking made a gross profit of £98,617. From this there had been paid as interest on loans £24,770, and £31,926 had been set aside for sinking fund purposes; leaving a net profit of £41,921, which had been carried to the reserve and renewal account. This account had to its credit at the beginning of the year £75,120, and after payment of £9,000 in relief of rates and £10,000 for renewal of permanent way the account at the end of the year stood at £89,000. From this sum the Council had voted in relief of rates a sum of £17,200. Of the total capital expenditure of £1,002,566 there had been paid off through sinking fund a sum of £378,000.

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## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended June 28 amounted to £247,325, or £10,543 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £91 3s. 11d. per track mile, an increase of £2 3s. 7d. per mile as compared with last year.

(*Continued from page 2.*)

### TOWNSHIP OF SOUTH MANCHESTER.

TO ENGINE BUILDERS.

The Guardians of the Poor of the Township of South Manchester are prepared to receive tenders from engine builders for one 9-11 Kilowatt Steam Dynamo, erected complete at the Sanatorium, "Plas Uchaf," Abergele, North Wales.

Specifications and particulars may be obtained at the offices of Mr. F. W. Page, A.M.Inst.C.E., Consulting Engineer, Clarendon Chambers, 14, St. Ann's Square, Manchester, after the 5th inst., upon payment of £2 2s., which sum will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Steam Dynamo," must be delivered to the undersigned at the Guardians' Offices, All Saints, Manchester, not later than Saturday, July 12, 1913.

The Guardians do not bind themselves to accept the lowest or any tender.

By order, DAVID S. BLOOMFIELD,
Clerk to the Guardians.

Guardians' Offices,
All Saints, Manchester,
July 1, 1913.

### FOR SALE.

A number of Trolley Standards, D.K. latest enclosed spring type.

H. ENGLAND, General Manager,
Yorkshire (West Riding) Electric Tramways Co., Ltd.,
Belle Isle. Wakefield.

### POSITIONS VACANT.

### COUNTY BOROUGH OF SOUTHAMPTON.

TRAMWAYS MANAGER.

The Corporation invite applications for the position of Tramways Manager at a commencing salary of £400 per annum.

Applicants must have had previous experience in the management and construction of electric tramways (overhead trolley system) and be capable of taking the entire control of the Corporation Tramways Undertaking, including the maintenance of the electrical equipment and the permanent way and the designing and construction of extensions thereof.

Applications stating age, qualifications, experience, and present and previous occupation, accompanied by copies of not more than three recent testimonials, enclosed in an envelope, endorsed "Tramways Manager," must be sent on or before the 21st July to the Town Clerk.

Canvassing any member of the Council, either directly or indirectly, will disqualify.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
July 1, 1913.

### WALTHAMSTOW URBAN DISTRICT COUNCIL.

APPOINTMENT OF CHIEF INSPECTOR IN TRAMWAYS DEPARTMENT.

Applications are invited for the position of Chief Inspector of the Walthamstow Council Tramways, at a commencing salary of £130 per annum, rising by annual increments of £10, to £160.

Applicants must have had practical experience in the regulation and control of tramway traffic, and must be capable of taking charge of the undertaking in the absence of the manager.

A schedule of the duties attached to the office may be obtained on application to Mr. William Murray, A.I.E.E., Tramways Manager, Chingford Road, Walthamstow.

Applications in the candidate's own handwriting, stating age, and past experience, and accompanied by copies of three recent testimonials should be delivered to the undersigned, endorsed "Chief Inspector," not later than 5 p.m. on Monday, the 14th day of July, 1913.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
July 2, 1913.

### PLATELAYER.

Wanted, good Platelayer. Must have had tramways experience. Wages 8d. per hour.

Apply to General Manager, Coventry Corporation Tramways, Coventry.

## COPPER AND ALUMINIUM MARKET.

July 4, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, July 4. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 63 10 0 .. | 63 10 0 .. | 77 2 6 |
| ,, ,, (three months) .. .. | 65 12 6 .. | 65 17 6 .. | 78 0 0 |
| Electrolytic Copper—bars or ingots .. | 68 5 0 .. | 68 10 0 .. | 80 10 0 |
| Aluminium—bars or ingots .. .. .. | 89 0 0 .. | 90 0 0 .. | 76 10 0 |

## COAL MARKET.

July 4, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, July 4. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 .. | 25 0 | Quotations owing to transport workers strike. | 23 0 |
| Best Seconds .. .. .. | 23 6 .. | 23 6 | | 21 9 |
| Ordinary Drys .. .. | 20 6 .. | 20 6 | | 19 3 |
| Best Washed Nuts .. .. | 20 6 .. | 20 6 | | 18 9 |
| Best Washed Peas .. .. | 19 0 .. | 19 0 | | 17 6 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 .. | 20 6 .. | 17 6 .. | 19 0 |
| Best Seconds .. .. | 19 0 .. | 19 0 .. | 16 9 .. | 17 9 |
| Ordinary Drys .. .. | 16 0 .. | 16 0 .. | 15 0 .. | 15 6 |
| Best Washed Nuts .. .. | 16 0 .. | 16 0 .. | 14 0 .. | 15 0 |
| Best Washed Peas .. .. | 14 6 .. | 14 6 .. | 12 6 .. | 13 6 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 .. | 15 0 .. | 13 3 .. | 11 3 |
| Best Seconds .. .. .. | 13 6 .. | 13 6 .. | 11 6 .. | 9 3 |
| Smalls .. .. .. | 8 9 .. | 8 9 .. | 8 6 .. | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | July 1 | £47,019 | £53,652 | 26 | £1,451,761 | +£120,639 |
| Auckland (28 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,993 |
| Ballarat and Bendigo | May 18 | 830 | 852 | 7 | 7,112 | — 18 |
| Bombay Rs. | June 6 | 2,968 | 3,413 | 23 | 71,918 | + 3,200 |
| Brazilian St. Rly. Mins | May | 40,507 | 44,820 | 43 | 447,247 | + 9,595 |
| Brazilian Traction | June 21 | 79,573 | 94,152 | 25 | 2,261,524 | + 30,701 |
| Brisbane | May | 22,850 | 26,560 | 21½ | 125,990 | + 39,906 |
| British Columbia $ | May | 491,826 | 566,128 | 47 | 6,269,123 | +1,017,780 |
| Buenos Aires Pt. & City | Feb. | 6,269 | 6,726 | 9 | 12,697 | — 1,100 |
| Buenos Aires Lacroze | June | 41,518 | 44,179 | 52 | 529,749 | + 43,906 |
| Calcutta Rs. | June 28 | 56,546 | 61,386 | 26 | 16,38,398 | + 69,443 |
| Cape Town | April | 11,771 | 12,175 | 17 | 51,462 | + 3,148 |
| Carthagena & Herreria | June | 1,611 | 2,158 | 26 | 17,331 | + 6,498 |
| East India | May | 1,679 | 1,867 | 43 | 18,389 | + 2,646 |
| Kalgoorlie | May | 3,270 | 3,059 | 21 | 14,372 | — 984 |
| La Plata | June | 3,557 | 4,846 | 26 | 31,571 | + 6,822 |
| Lima | April | 31,657 | 32,890 | 27 | 184,767 | + 6,133 |
| Lisbon Mrs. | Jan. | ... | 147,848 | 4 | 147,848 | ... |
| Madras (14 days) Rs. | June 30 | 22,995 | 26,556 | 26 | 319,165 | + 22,507 |
| Melbourne | May | ... | 62,000 | 21½ | 324,000 | ... |
| Mexico $ | May | 559,882 | 595,795 | 21½ | 2,676,760 | — 36,306 |
| Montevideo | June | 26,392 | 28,820 | 34 | 258,427 | + 20,005 |
| Para | June 29 | 3,926 | 3,813 | 30 | 123,205 | + 3,627 |
| Perth (W.A.) | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,552 |
| Port Elizabeth | April | 3,420 | 4,357 | 17 | 16 388 | + 1,312 |
| Shanghai $ | June 11 | 20,416 | 25,200 | 23 | 466,252 | + 35,720 |
| Singapore $ | June 28 | 10,288 | 11,666 | 26 | 302,496 | + 32,240 |
| Toronto $ | May | 693,015 | 811,872 | 21 | 3,840,280 | + 524,541 |
| Winnipeg $ | May | 298,743 | 326,827 | 21 | 1,651,336 | + 143,036 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London | June 28 | £5,044 | £5,292 | 26 | £133,243 | +£12,431 |
| City and South London | ,, 28 | 3,139 | 2,605 | 26 | 78,983 | — 7,652 |
| Great N. and City | ,, 28 | 1,538 | 1 355 | 26 | 37,863 | — 5,125 |
| Liverpool Overhead | ,, 29 | 1,619 | 1,826 | 26 | 42,786 | + 2,782 |
| London Electric | ,, 28 | 13,745 | 13.795 | 26 | 369,280 | + 3,295 |
| Mersey | ,, 28 | 1,979 | 2,150 | 26 | 58,169 | + 3,644 |
| Metropolitan | ,, 29 | 18,084 | 18.102 | 26 | 434,703 | + 3,086 |
| Metropolitan District | ,, 28 | 13,489 | 13.943 | 26 | 342,656 | + 13,581 |

**DICK, KERR & CO.,**
**Limited,**
**ABCHURCH YARD, CANNON STREET,**
**LONDON, E.C.**
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**Complete Equipment**
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**at home and abroad.**

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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregates. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | June 25 | £1,577 | £1,591 | + £13 | 4 | £5,905 | + £235 |
| Ayr Corporation ..... | ,, 28 | 354 | 394 | + 40 | 6 | 2,196 | + 113 |
| Bath Electric ..... | ,, 25 | 1,007 | 1,194 | + 187 | 26 | 22,172 | + 340 |
| Birmingham Corp. ..... | ,, 28 | 10,760 | 11,411 | + 651 | 13 | 147,508 | + 10,513 |
| Blackburn Corporation | ,, 25 | 1,260 | 1,289 | + 29 | 13 | 16,866 | + 1,029 |
| Blackpool & Fleetwood | ,, 23 | 818 | 904 | + 86 | 26 | 13,308 | + 894 |
| Blackpool Corporation | ,, 19 | 1,160 | 1,435 | + 275 | 11¼ | 14,643 | + 379 |
| Bolton Corporation ..... | ,, 29 | 2,629 | 2,809 | + 180 | 13 | 35,051 | + 1,349 |
| Bournemouth Corp..... | July 2 | 1,813 | 2,110 | + 297 | 13 | 26,525 | + 2,227 |
| Bradford Corporation... | June 28 | 5,610 | 5,971 | + 361 | 13 | 76,594 | + 3,184 |
| Brighton Corporation... | ,, 29 | 1,263 | 1,375 | + 112 | 13 | 13,138 | — 49 |
| Bristol ..... | ,, 27 | 8,421 | 8,890 | + 469 | 25½ | 189,181 | + 19,712 |
| British Elec.Traction— | | | | | | | |
| Airdrie ..... | June 27 | 326 | 400 | + 74 | 26 | 8,471 | + 1,156 |
| Barnsley ..... | ,, 27 | 197 | 340 | + 143 | 26 | 6,418 | + 2,156 |
| Barrow ..... | ,, 27 | 426 | 469 | + 43 | 26 | 9,692 | + 638 |
| Birmg.& Mid. Joint— | | | | | | | |
| Birmingham Dist. ... | June 27 | 975 | 984 | + 9 | 26 | 26,013 | + 1,313 |
| Dudley—Stourbridge | ,, 27 | 902 | 1,021 | + 119 | 26 | 23,417 | + 2,047 |
| South Staffordshire... | ,, 27 | 953 | 943 | — 10 | 26 | 25,660 | + 2,178 |
| Wolverhampton Dist. | ,, 27 | 482 | 498 | + 16 | 26 | 13,070 | + 1,045 |
| Devonport ..... | ,, 27 | 578 | 582 | + 4 | 26 | 13,486 | — 138 |
| Gateshead ..... | ,, 27 | 1,310 | 1,687 | + 377 | 26 | 30,206 | + 4,284 |
| Gravesend & N'thfleet | ,, 27 | 197 | 245 | + 48 | 26 | 5,692 | + 523 |
| Greenock—P.Gl'sgow | ,, 27 | 912 | 1,028 | + 116 | 26 | 21,020 | + 1,187 |
| Jarrow ..... | ,, 27 | 210 | 226 | + 16 | 26 | 3,592 | + 178 |
| Kidderminster ..... | ,, 27 | 138 | 141 | + 3 | 26 | 2,806 | + 53 |
| Merthyr ..... | ,, 27 | 368 | 222 | — 146 | 26 | 5,499 | + 632 |
| Metropolitan ..... | ,, 27 | 9,640 | 9,777 | + 137 | 26 | 228,718 | + 4,776 |
| Middleton ..... | ,, 27 | 387 | 389 | + 2 | 26 | 8,739 | + 491 |
| Oldham—Ashton..... | ,, 27 | 653 | 650 | — 3 | 26 | 15,609 | + 239 |
| Peterborough ..... | ,, 27 | 172 | 197 | + 25 | 26 | 3,944 | + 773 |
| Potteries ..... | ,, 27 | 2,031 | 2,064 | + 33 | 26 | 53,648 | + 7,205 |
| Rothesay ..... | ,, 27 | 295 | 362 | + 67 | 26 | 3,502 | + 397 |
| Sheerness ..... | ,, 27 | 56 | 58 | + 2 | 26 | 1,264 | + 87 |
| South Metropolitan... | ,, 27 | 949 | 937 | — 12 | 26 | 20,751 | — 404 |
| Southport ..... | ,, 27 | 330 | 352 | + 22 | 26 | 7,467 | + 402 |
| Swansea ..... | ,, 27 | 1,172 | 1,290 | + 118 | 26 | 31,160 | + 3,041 |
| Taunton ..... | ,, 27 | 48 | 45 | — 3 | 26 | 1,187 | + 95 |
| Tynemouth..... | ,, 27 | 504 | 580 | + 76 | 26 | 5,669 | + 480 |
| Weston-super-Mare.. | ,, 27 | 197 | 278 | + 81 | 26 | 2,421 | + 390 |
| Worcester ..... | ,, 27 | 826 | 377 | + 51 | 26 | 7,299 | + 303 |
| Wrexham & District.. | ,, 27 | 119 | 132 | + 13 | 26 | 3,019 | + 287 |
| Yorks (Woollen) Dist. | ,, 27 | 1,155 | 1,189 | + 34 | 26 | 29,227 | + 2,201 |
| Burnley Corporation .. | ,, 28 | 1,457 | 1,623 | + 166 | 13 | 21,471 | + 2,195 |
| Burton-on-Trent Corp. | ,, 29 | 282 | 277 | — 5 | 13 | 3,663 | + 133 |
| Bury Corporation..... | ,, 29 | 1,283 | 1,359 | + 76 | 14 | 17,596 | + 249 |
| Cardiff Corporation.... | ,, 21 | 2,512 | 2,913 | + 401 | 12 | 31,337 | + 4,517 |
| Chatham and District.. | ,, 26 | 895 | 953 | + 58 | 25 | 22,070 | + 941 |
| Chesterfield Corp. ..... | ,, 26 | 231 | 252 | + 21 | 12 | 3,129 | + 451 |
| Colne & Trawden..... | ,, 28 | 268 | 277 | + 9 | 26 | 6,714 | + 304 |
| Cork Electric..... | ,, 26 | 529 | 555 | + 26 | 25 | 11,987 | — 198 |
| Croydon Corporation .. | ,, 20 | 2,132 | 1,772 | — 360 | 11 | 19,377 | — 3,057 |
| Darlington Corporation | ,, 21 | 236 | 250 | + 14 | 12 | 2,956 | + 325 |
| Derby Corporation ..... | ,, 28 | 937 | 986 | + 49 | 13 | 12,619 | + 1,771 |
| Dover Corporation .... | ,, 28 | 253 | 249 | — 4 | 13 | 2,973 | — 103 |
| Dublin & Lucan ..... | ,, 30 | 240 | 309 | + 69 | 26 | 3,601 | + 67 |
| Dublin United ..... | ,, 27 | 6,408 | 6,436 | + 28 | 25½ | 148,142 | + 2,074 |
| Dundee City ..... | ,, 25 | 1,243 | 1,297 | + 54 | 6 | 7,094 | + 669 |
| East Ham Corporation | ,, 28 | 1,052 | 994 | — 58 | 13 | 13,742 | + 165 |
| Exeter Corporation ..... | ,, 27 | 365 | 359 | — 6 | 13 | 4,234 | — 6 |
| Glasgow Corporation .. | ,, 28 | 20,015 | 20,860 | + 845 | 4 | 83,902 | + 6,390 |
| Glossop(U.Elec.Supply) | ,, 28 | 131 | 130 | — 1 | 26 | 3,294 | + 468 |
| Halifax Corporation ... | ,, 24 | 2,283 | 2,214 | — 68 | 12 | 25,788 | — 463 |
| Hastings & District..... | ,, 26 | 1,058 | 1,035 | — 23 | 26 | 22,729 | + 1,151 |
| Huddersfield Corp. ..... | ,, 28 | 2,038 | 2,142 | + 104 | 13 | 27,522 | + 1,603 |
| Hull Corporation ..... | ,, 28 | 3,915 | 3,114 | + 199 | 13 | 39,293 | + 2,309 |
| Ilford U.D.C. ..... | ,, 28 | 552 | 483 | — 69 | 13 | 5,981 | — 1,020 |
| Ilkeston Corporation .. | July 2 | 139 | 137 | — 2 | 14 | 1,765 | + 435 |
| Ipswich Corporation .. | June 26 | 469 | 488 | + 19 | 13 | 5,684 | + 31 |
| Isle of Thanet ..... | ,, 28 | 901 | 955 | + 54 | 39 | 16,213 | + 839 |
| Kilmarnock Corp. ..... | ,, 28 | 167 | 173 | + 6 | 6 | 1,143 | + 71 |
| Lanarkshire ..... | ,, 26 | 1,581 | 1,750 | + 169 | 25 | 41,436 | + 5,809 |
| Lancashire United ..... | ,, 25 | 1,425 | 1,580 | + 155 | 25 | 36,613 | + 3,614 |
| Leeds City ..... | ,, 28 | 8,141 | 8,403 | + 262 | 13 | 106,831 | + 2,352 |
| Leicester Corporation.. | ,, 28 | 2,737 | 3,003 | + 266 | 26 | 71,210 | + 7,344 |
| Leith Corporation ..... | ,, 28 | 778 | 752 | — 26 | 26 | 4,682 | + 300 |
| Liverpool Corporation.. | ,, 28 | 12,315 | 13,172 | + 857 | 25½ | 319,663 | + 18,668 |
| Llandudno &Colwyn B. | ,, 27 | 363 | 417 | + 54 | 30 | 6,861 | + 726 |
| London County Council | ,, 25 | 43,884 | 42,997 | — 887 | 12 | 519,792 | — 20,359 |
| London Gnl. Omnibus.. | ,, 28 | 57,726 | 72,466 | +14,740 | 26 | 1,575,766 | + 362,736 |
| London United ..... | ,, 27 | 7,177 | 7,304 | + 127 | 26 | 154,436 | — 2,299 |
| Lowestoft Corporation | ,, 28 | 173 | 219 | + 46 | 38 | 6,387 | + 343 |
| Maidstone Corporation | ,, 26 | 200 | 211 | + 11 | 13 | 2,538 | + 139 |
| Manchester Corp..... | ,, 28 | 17,218 | 17,597 | + 379 | 13 | 223,200 | + 10,227 |
| Nelson Corporation..... | ,, 28 | 193 | 232 | + 39 | 13 | 2,691 | + 43 |
| N'castle-on-Tyne Corp. | ,, 28 | 7,070 | 8,076 | + 1,006 | 13 | 62,779 | + 5,087 |
| Newport (Mon.) Corp... | ,, 28 | 729 | 769 | + 40 | 13 | 9,479 | + 598 |
| New St. Helens & Dist.. | ,, 25 | 805 | 838 | + 33 | 52 | 39,536 | + 1,888 |
| Northampton Corp..... | ,, 27 | 573 | 591 | + 18 | 12½ | 7,258 | + 134 |
| Nottingham Corp. ..... | ,, 26 | 3,254 | 3,332 | + 78 | 12½ | 41,679 | + 1,353 |
| Oldham Corporation .. | ,, 29 | 2,049 | 2,166 | + 117 | 14 | 29,835 | + 1,140 |
| Portsmouth Corp..... | ,, 28 | 2,170 | 2,587 | + 417 | 13 | 27,341 | — 440 |
| Preston Corporation .. | ,, 25 | 781 | 803 | + 22 | 13 | 11,189 | + 735 |
| Provincial ..... | ,, 28 | 2,004 | 2,119 | + 115 | 38½ | 66,694 | + 3,062 |
| Reading Corporation .. | ,, 26 | 696 | 713 | + 17 | 12 | 8,406 | + 391 |
| Rochdale Corporation | ,, 28 | 1,499 | 1,574 | + 75 | 13 | 20,349 | + 244 |
| Rotherham Corp..... | July 2 | 749 | 974 | + 225 | 13 | 12,776 | + 3,432 |
| Salford Corporation .. | June 30 | 5,102 | 5,275 | + 173 | 13 | 67,954 | + 1,195 |
| Sheffield Corporation.. | ,, 29 | 6,835 | 7,395 | + 560 | 14 | 101,029 | + 10,790 |
| Southampton Corp..... | ,, 25 | 1,358 | 1,337 | — 21 | 12 | 15,682 | + 343 |
| Southend-on-Sea Corp. | ,, 25 | 842 | 992 | + 150 | 13 | 10,172 | + 868 |
| South Shields Corp..... | ,, 28 | 806 | 919 | + 113 | 13 | 9,030 | + 1,132 |
| Sunderland Corp..... | ,, 29 | 1,391 | 1,622 | + 231 | 13 | 18,084 | + 1,832 |
| Sunderland District .. | ,, 25 | 470 | 552 | + 82 | 34 | 18,040 | + 3,413 |
| Swindon Corporation'.. | ,, 25 | 153 | 168 | + 15 | 12 | 2,000 | + 171 |
| Trys.(M.E.T.)Omn. Co. | ,, 28 | ... | 5,433 | ... | 26 | 59,066 | ... |
| TynesideTrys.&Tmrds | ,, 25 | 1,557 | 1,711 | + 154 | 26 | 13,673 | + 761 |
| Wallasey Corporation | ,, 28 | 1,167 | 1,237 | + 70 | 13 | 15,363 | + 942 |
| Walsall Corporation ... | ,, 28 | 597 | 603 | + 6 | 26 | 15,781 | + 1,188 |
| Walthamstow U. D.C. | ,, 28 | 797 | 746 | — 51 | 13 | 9,713 | — 517 |
| Warrington Corp..... | ,, 26 | 467 | 444 | — 23 | 13 | 5,584 | + 295 |
| West Ham Corporation | ,, 26 | 2,755 | 2,849 | + 94 | 12½ | 34,484 | + 503 |
| Wigan Corporation..... | ,, 26 | 1,310 | 1,449 | + 139 | 12½ | 18,305 | + 2,035 |
| Wolverhampton Corp | July 2 | 1,023 | 1,086 | + 63 | 14 | 14,340 | + 722 |
| Yorkshire (W. Riding) | June 29 | 1,278 | 1,461 | + 183 | 26 | 36,664 | + 4,201 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, July 4. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 79 — 82 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | + 1/4 | 4¼ — 5 xd |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4 7/16 — 4 11/16 ,, |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 90⅜ — 92½ ,, |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 94½ — 96½ ,, |
| 100 | Do. 5% Deb. Stk. Red..... | ... | 95½ — 97½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 99 —101 xd |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | 7/16 — 9/16 |
| 1 | Do. 5% Cum. Pref ..... | ... | 23/32 — 25/32 xd |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red..... | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 xd |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | + 1/4 | 13½ — 14½ |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref ... | ... | 10¾ — 11⅝ |
| 100 | Do. do. 4½% Db. Stk. Red. | ... | 94 — 96 xd |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 3½ | 85½ — 87½ |
| 5 | Brisbane Elec. Trams. InvestmentCo., Ltd., Ord. ..... | ... | 6¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. ... | ... | 97 —100 xd |
| 10 | Bristol Tramways and Carriage Co. ..... | — 1/8 | 5¾ — 6¼ ,, |
| 10 | Do. do. 4% Cum. Pref. ..... | — 2 | 7 — 7¼ ,, |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 ,, |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 93 — 95 ,, |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | + 2 | 121 —126 |
| 100 | Do. Pref. Ord. Stock ..... | + 2 | 107 —112 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | + 1/2 | 101 —104 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | + 1 | 95 — 97 |
| 100 | British Elec. Traction Co., Lim.. 6% Cum. Pref..... | — 2 | 78 — 81 xd |
| 100 | Do. 7% Non-Cum. Pref. ..... | — 1 | 38 — 41 ,, |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | — 1½ | 8 — 10 |
| 100 | Do. Deferred Ord. Stock ..... | — 1½ | 3½ — 5⅛ |
| 100 | Do. 5% Perpetual Debenture Stock..... | ... | 89 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | — 1 | 73 — 77 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 92 — 96 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | — 1/8 | 98½ —100⅛ |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5⅝ — 6⅛ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4 1/16 — 5 1/16 xd |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98¼ ,, |
| 1 | Cape Electric Tramways, Ld., ..... | ... | 11/16 — 13/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3¾ — 4 |
| 190 | Do. 5% Debs.. Red. ..... | — 2½ | 87½ — 90 ½xd |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5¾ — 5⅝ |
| 100 | Do. 4% Debenture Stock Red, 1985 ..... | + 1½ | 92 — 97 xd |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. . | ... | 90½ — 94⅝ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | — 2½ | 92½ — 94½ xd |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8 1/16 |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | + 1/8 | — 11 9/16 |
| 10 | Do. do. 6% Pref. ..... | ... | — 12⅛ |
| 100 | Do. do. "A" Red. ..... | — 1¼ | — 81 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79¾ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8¾ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co.. Ld., Ord. ..... | ... | 3/16 — 5/16 |
| 1 | Do. do. 6% Cum.Pref. ..... | ... | 17/32 — 19/32 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort.5% Bonds ..... | ... | 97 —101 |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | + 2 | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | — 1/8 | 4 — 4½ xd |
| 10 | Do. do. 6% Cum. Pref. ..... | — 1/8 | 7 — 7¼ ,, |
| 100 | Do do. 4½% Deb. Stock ..... | — 2 | 78 — 80 ,, |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2¼ — 2¾ |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 xd |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 3/16 — 5/16 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/8 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | 33/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 10⅞ — 10¾ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. ..... | ... | 76 — 78 xd |
| 1 | Lisbon Electric Trams., Lim., Ord. ..... | ... | 1 3/32 — 1 11/32 |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 — 1¼ xd |
| 100 | Do. 5% Mort. Debs. ..... | — 1 | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | 3/32 — 13/32 |
| 100 | London General Omnibus Company, Limited,4½% Deb. | ... | 92 — 94 xd |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 88 — 90 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | — 1 | 59 — 63 xd |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 ,, |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | — 2½ | 87½ — 90½ ,, |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 109 —112 |
| $1,000 | Do. do. 5% Bds. ..... | ... | 98¼ —100⅝ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1/16 — 1 1/16 |
| 100 | Metropolitan Elec. Trms. Ltd..4½% Deb. Stock, Red. .. | — 1 | 84 — 88 xd |
| 100 | Do. 5% Deb. Stock, Red .. | ... | 91¼ — 94½ |
| $100 | Mexico Tramways Co., Common Stock ..... | — 3 | 93 — 96 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 89 — 92 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — 4 | 91 — 94 xd |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) .. | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. ..... | — 1/16 | 1⅛ — 1¼ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6¼ — 6¾ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 6⅛ — 6⅞ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6⅝ — 7⅛ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5 |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. ..... | ... | 1⅛ — 1¾ |
| 100 | Do. do. 5% 1st Mt. Deb. Stk. Rd. | ... | 102½ —105½ xd |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 9/32 — 13/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | 7/16 — 11/16 |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| ... | Provincial Tramways, Lim.. Ord. ..... | ... | 31/32 — 1 3/32 xd |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100⅛ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5%.. | — 4 | 84 — 87 xd |
| 5 | Rangoon Elec. Trams. & Supply Co.. 6% Cum. Pref..... | ... | 5¼ — 5¾ ,, |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 95 — 97 ,, |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | — 2¼ | 96¼ — 98¼ |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | + 1/2 | 91 — 93 |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | ... | 99 —101 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8¼ — 9¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 83½ — 87½ |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | 5/8 — ¾ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 63 — 68 xd |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 96 — 98 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 93 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 87 — 89 xd |
| 100 | Tramways (M.E.T.) Omnibus Co.. 4½% Gtd. Deb. Stk. | ... | 83¾ — 92¼ |
| 5 | United Elec. Tramways of Monte Video. Ord. ..... | ... | 4⅜ — 4⅞ xd |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ ,, |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | + 1/2 | 97 — 99 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ —101½ |
| 5 | yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | 1/4 — 3/4 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 3 1/16 — 3 3/16 xd |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 80 — 84 |

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# THE TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION AT BLACKPOOL.

## FIFTH ANNUAL CONGRESS.

The Annual Congress of the Tramways and Light Railways Association grows steadily in interest and importance, and the meeting held at Blackpool last month was again eloquent of the energy and ability with which the work of the Association is carried on. In the members of the Council and the secretary, Mr. A. de Turckheim, the Association have representatives who are closely in touch with the needs of the industry and spare no pains to advance its interests. Members have opportunities to judge of the thoroughness with which the work is conducted from the elaborate arrangements made for the annual congresses. At these gatherings everything seems to be provided for down to the least detail with a degree of care and precision that amounts to positive genius. Not only do the formal proceedings go with a businesslike swing, but the whole of the meeting is characterised by an excellent spirit which adds not a little to the enjoyment of those who attend. Another feature which tends, no doubt, to enhance the interest of the annual gatherings is that they include representatives of all branches of the tramway industry. Both municipal and company tramways are well represented, and year by year the barriers, which in what we may call the bad old days when the two interests regarded one another with covert hostility, have gradually disappeared. We believe that this union of interests is all to the good. It does not detract in any way from the value of the Municipal Tramways Association, which has an assured position of great usefulness, but it provides common ground for the meeting of those who might not often otherwise be brought into contact; and it affords opportunity for the expression of opinion on behalf of the whole industry, which at certain times must be particularly useful. Two matters, for instance, discussed at Blackpool—the question of goods haulage on tramways and the present burden laid on tramways for the upkeep of roads—concern municipal tramways as much as privately-owned lines, and the unanimous expression of opinion elicited upon these two important topics may be considered as registering a material step in a forward programme. In the following pages are given practically in full the papers read at the Congress and the discussions upon them. They deal with subjects of much importance to tramway administrators and owners and will repay perusal.

Overhead Trolley Tramway on "The Front" at Blackpool.

With his customary thoughtfulness the secretary had arranged for special saloons to be attached to the 2 p.m. Scotch express from Euston on Wednesday, June 10, and many members took advantage of the through carriages. On arrival at the Imperial Hydro Hotel, the head-quarters of the Congress, the party were joined by members who had come from other parts of the country, and the evening was devoted to informal reunions and the exploration of that astonishing example of municipal enterprise which is described by enthusiastic residents as "the one and only Blackpool." As a seaside resort it is, indeed, in many respects

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unrivalled. Our American street railway friends sometimes sing the praises of Atlantic City and its "million-dollar pier" on which they often hold their conventions; but Atlantic City has not the wealth of resources that renders Blackpool peerless as a popular playground. Democracy, too, would look far without finding a more complete exponent of the spirit of collective enterprise. The activities of the municipality are endless, and it devotes the same enthusiasm to the entertainment of the multitudes who throng its promenades and play-houses as it does to the provision of sanitation and tramway transport. In the latter respect the Town Council has for many years been amongst the most progressive authorities in the kingdom. As long ago as 1885 they installed a conduit tramway along the front, but finding it unsuitable for the conditions they replaced it with the trolley system, and from time to time they have extended their lines until they have to-day a total length of track of 21 miles. Private companies on either flank have emulated the example of the Corporation, and the Blackpool and Fleetwood Tramroad Company's cars take passengers northward along the coast to Fleetwood, while the Blackpool, St. Anne's, and Lytham Tramways similarly serve the popular resorts southward, their lines extending for some seven miles through a district diversified by pleasant residences, sylvan retreats, and golden sea-shore.

Fresh arrivals on Thursday morning brought the attendance up to nearly 200, and many members and guests were accompanied by ladies, for whom a special programme had been arranged. About 10 o'clock a large company gathered in the ballroom of the hydro, where they were welcomed with great cordiality by the Mayor of Blackpool and representatives of the local tramway companies referred to above. After the opening ceremony, Mr. Harry England, vice-chairman of the Association, presided in the absence of the Hon. Arthur Stanley, who was unable to reach Blackpool until evening, and the Conference gave its attention for nearly three hours to the discussion of papers by Mr. Edwardes, general manager of the Lancashire United Tramways, on the "Possibilities of Increasing Profits on Interurban Tramways," and by Mr. Fred Bland, of Messrs. Edgar Allen and Company, on "Tramway Track, 1883 to 1913." The former dealt mainly with the question of goods traffic on tramways, and the discussion was notable for the general consensus of opinion expressed that the matter ought to be practically studied through a committee to be specially formed. Mr. Bland's paper reviewed the progress in track construction from the early days of electric traction to the present time. Mr. Bland has been concerned in trackwork in all its phases, and he put forward a strong plea for standardisation. He viewed the matter from the standpoint of both the manufacturer and the user, and we shall be surprised if his treatment of the subject does not lead to an improvement in the direction indicated. The paper afforded a useful illustration of the advantage to be derived from the participation in the work of the Association of the engineer who is engaged on the manufacturing side. When the chairman reluctantly closed the discussion, the members adjourned to luncheon, and in the afternoon in perfect weather were conveyed in special cars provided by the Blackpool, St. Anne's, and Lytham Tramways to Lytham. On the return journey they were entertained by the tramway company to tea at the Imperial Hydro at St. Anne's, after which the cars returned to Blackpool.

In the evening the members and delegates were entertained to a banquet by the Mayor of Blackpool, Councillor M. G. Wilde. An excellent dinner, well served, an attractive musical programme, and speeches of more than usual lightness and verve, combined to make a very successful evening. Of the speeches we attempt no report. They were brief, merry, and admirably suited to the occasion. After the loyal toasts, the Mayor proposed the "Tramways and Light Railways Association," and in reply Mr. Harry England expressed the thanks of the Association for the splendid hospitality of the Corporation, and alluded to the value of such conferences as they were holding. The Hon. Arthur Stanley then gave "The Corporation of Blackpool" in a capital speech, bristling with good points. In response, Alderman Brodie, chairman of the Blackpool Tramways Committee, in his own inimitable way, spread merriment throughout the company. His account of the heroic exploration in times past of himself and of the Blackpool councillors on the Continent in search of the best tramway system for application in Blackpool, was punctuated with applause and laughter. Sir Edward White, chairman of the L.C.C. Highways Committee, proposed "The Mayor of Blackpool," contrasting the happy position of Blackpool as regards tramways with the difficulties with which London was beset.

On the Friday morning the Hon. Arthur Stanley presided, and two papers of much value were presented. Mr. Harry England's monograph on "Railless Traction Legislation" is a digest and analysis of the private Acts passed by Parliament authorising the construction and working of railless undertakings and trolley omnibuses; and it will long remain a source of information to which everyone concerned with such enterprises will turn with gratitude to its author for much painstaking investigation. Not less useful was Mr. England's introduction to his paper, and his strong but fully justified criticism of the unfair competition of motor vehicles, which have provided for them free of cost a permanent way for which tramway undertakings have to pay so dearly, should help to strengthen the determination to bring about a change in the existing conditions. The Hon. Arthur Stanley, in closing the discussion, emphasised the necessity for a central road authority which would devise some fair system of taxation, so that all users of the roads would contribute an equitable share to their maintenance. Undoubtedly a comprehensive and general plan applying to all interests is what is wanted; and as Mr. Stanley said, Mr. England's valuable paper has initiated a discussion that will have far-reaching effects. The concluding item on the programme was a paper by Mr. A. V. Mason on "Rules and Regulations for Tramway Employees." This paper Mr. Mason described as an explanation of the rules and regulations recently published by the Association, and as a member of the committee which had drawn up the rules Mr. Mason was prepared for criticism; but nothing very serious was said against the rules which, of course, are not put forward in any dogmatic way, but as suggestions which may be helpful in securing some degree of uniformity.

On the adjournment of the Congress, the members and guests were taken in special cars of the Blackpool and Fleetwood Tramroad Company to Norbreck Hydro, where luncheon was provided for them as guests of the company. Mr. John Cameron, who has been general manager and secretary of the company since its formation in 1898, was enthusiastically acclaimed by the gathering when he rose to say a few words of welcome. After luncheon the cars were again boarded and the party journeyed to Fleetwood. Here the steamer "Lady Moyra" was in waiting, and the company were taken across Morecambe Bay to Barrow, and then by train to Furness Abbey. Subsequently the company returned to Blackpool and the Fifth Annual Conference of the Association was brought to an end by a members' supper and dance at the Imperial Hydro Hotel.

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# TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

# Full Report of the Annual Congress,

## JUNE 12 and 13, 1913.

The Fifth Annual Congress of the Tramways and Light Railways Association was opened at the Imperial Hydro, Blackpool, on Thursday, June 12, some 200 members and delegates being present from various parts of the country, among whom were the following:

R. Ainsworth.
J. G. Ames.
A. Anderson.
Geo. H. Anger.
J. G. Anger.
E. E. Armitage.
R. H. Aspinall.
C. I. Baker.
C. Barber.
E. P. Barfield.
R. B. Barningham.
E. S. Barralet.
B. J. Battson.
Coun. Bean.
H. H. Berry.
Ald. J. Bickerstaffe.
Ald. T. Bickerstaffe.
C. Bickersteth.
A. A. Blackburn.
H. E. Blain.
Fred. Bland.
R. S. Boddington.
T. Bradley.
Coun. W. H. Broadhead.
Ald. J. Brodie.
Coun. H. Brooks.
Ald. H. Brown.
N. D. R. Bruce.
C. Burnet.
J. T. Callaghan.
Angus Cameron.
John Cameron.
J. M. Cater.
G. W. Chalmers.
A. W. A. Chivers.
A. Clare.
Coun. J. A. Clarke.
Major R. J. Clarke.
J. H. Clothier.
W. Clough.
Ald. Collinge.
Ald. J. Collins.
H. P. Conibear.
Fred. Coutts.
A. Coveney.
F. Crookes-Harris.
F. Crosby-Jones.
J. A. Cross.
E. E. Daglish.
W. T. Dawson.
A. de Turckheim.
Coun. Dewhurst.
J. M. Dick Peddie.
J. W. Dugdale.
John Eades, Jr.
J. C. Eadie.
F. Edmondson.
E. H. Edwardes.
Harry Edwards.
T. C. Elder.
W. F. Endean.
H. England.
D. Events.
F. Field.
E. H. Fleming.
Coun. T. P. Fletcher.
W. E. Freir.
C. Furness.
T. E. Gatehouse.
Coun. G. W. Gath.
Coun J. R. Gath.
O. T. Gibb.
W. Gilbert.
T. B. Goodyer.
W. L. Green.
R. R. Greene.
J. Greenwood.
Ald. J. Grime.
J. B. Hamilton.
Coun. Hardman.
B. F. Hargreaves.
H. Hawley.
D. Hays.
Rt. Hon. Lord Headley.
F. Hewer.
Ald. Heyes.
C. W. Hill.
Samuel Hill.
G. W. Holford.
Coun. Holt.
G. Hooghwinkel.
Coun. Howe.
J. S. Huddleston.
R. Hughman.
R. Humphries.
Jos. Hunter.
J. G. Hunter.
L. C. Huppert.
E. S. Hurlbath.
A. Imeson.
Coun. E. G. Isherwood.
Ald. W. Ivey.
D. James.
L. Johnston.
F. W. Ketley.
H. King Spark.
H. W. Laing.
H. H. Lancaster.
E. C. Laughton.
S. A. Ledger.
Ald. H. Linsley.
T. Loftos (town clerk).
H. Lotery.
T. Lumb.
H. J. McCormick.
T. McCubbin.
C. W. Mallins.
A. V. Mason.
F. H. Masters.
H. T. Maynard.
Coun. R. Mayne.
L. M. Myers.
E. A. Nash.
E. J. Neachell.
G. Nicholson.
J. F. North.
A. Norton.
W. R. Nowell.
Eric Osborn.
F. M. Osborn.
J. A. Panton.
E. A. Paris.
A. F. Paul.
W. B. Philipson.
W. B. Pickering.
L. E. Pickin.
G. Julyan Polglase.
Coun. J. Potter.
R. H. Prestwich.
G. Readman.
W. B. Richardson.
C. E. Riding.
Arch. Robertson.
Geo. Robertson.
Coun. J. H. Rodgers.
W. J. Rook.
F. E. Saunders.
H. M. Sayers.
H. Scholey.
Coun. Scholes.
K. A. Scott-Moncrieff.
F. S. Sells.
E. E. Sharp.
C. W. Shepherd.
J. How Shepherd.
R. T. Simcock.
J. F. Simpson.
L. Slattery.
T. M. Smith.
Hon. A. Stanley, M.P.
C. D. Stanley.
J. W. Stevens.
W. A. Stevens.
H. P. Stokes.
R. Stutz.
A. J. Talbot.
C. G. Tegetmeier.
Norman Tegetmeier.
W. Thom.
J. P. Tierney.
A. Toms.
J. Toulmin.
M. Turner.
P. Turner.
W. H. Turner.
Wm. Wallace.
Coun. Wallwork.
A. H. Walton.
Ald. Ward.
J. S. Waters.
Sir Edward White.
M. G. Wilde (mayor).
A. M. Willcox.
I. E. Winslow.
F. G. Wostenholme.
N. J. Young.

## RECEPTION BY THE MAYOR.

The Mayor of Blackpool, Councillor M. G. Wilde, J.P., and the Mayoress, Mrs. Wilde, were present at the opening of the Conference, and gave the visitors a hearty welcome. They were accompanied by several members of the Tramways Committee and of the Corporation, including the ex-Mayor, Councillor J. Collins, J.P., Alderman J. Brodie, J.P., the chairman of the Tramways and Electricity Committee, Alderman J. Bickerstaffe, J.P., Councillor R. Holt, the vice-chairman of the Tramways and Electricity Committee, Councillors J. R. Gath, T. P. Fletcher, T. Masheter, G. W. Gath, etc.

Mr. H. England, of Wakefield, the vice-chairman of the Executive Council of the Association, presided on Thursday, in the absence of the chairman, the Hon. Arthur Stanley, who was unable to reach Blackpool until the evening.

The MAYOR (Councillor M. G. Wilde) cordially welcomed the Conference to Blackpool. He reminded the delegates that they had come to a town that was progressive in character, that was well ruled in the interests of the ratepayers, and possessed an atmosphere that was good for its visitors. (Hear, hear.) Moreover, they had a Tramway Committee that was doing its best for the town by providing a good service. On the north of Blackpool they had also a most progressive company, the Blackpool and Fleetwood Tramroad Company, which was excellently managed by his friend Mr. John Cameron, who, he believed, was a member of the Council of the Association. On the south of Blackpool they had the Lytham and St. Anne's Tramways Company, whose cars passed through a most delightful district. As in the case of the Fleetwood cars, the Lytham service had done a great deal towards the prosperity of the surrounding districts. The Blackpool and Lytham tramways had undoubtedly been a great public convenience, and he could only regret that the people who had invested their money there were not doing better, though that was no fault of the management. Tramways, he thought, were doing very good work on behalf of the people of the country. They assisted in opening out and developing new districts, and helped the local authorities in making good roads. Blackpool people, he thought, were fortunate in having such a chairman of the Tramways Committee as Alderman Brodie, who was known in tramway circles throughout the country. Alderman Brodie had been the chairman for 17 or 18 years, and as he (the Mayor) had been a member of the committee for 14 years, he was able to say that Alderman Brodie was a model chairman. (Hear, hear.) His colleague, Councillor Holt, was also a very good vice-chairman, while in Mr. Furness they had one of the best tramway managers in the country. (Applause.) Mr. Furness came to Blackpool with the highest recommendations. He promised to do certain things for them, and he (the Mayor) could say publicly that Mr. Furness had more than fulfilled his promises. He had won the esteem and regard, and the trust and confidence of the whole of the Tramways Committee of the Corporation, and to-day was a red-letter day with him, inasmuch as he had brought down his colleagues in similar undertakings from various parts of the country. The Mayor concluded by expressing the hope that the deliberations of the Conference would be a success, and that the delegates would have a very happy time. (Applause.)

Mr. R. B. BARNINGHAM, of Manchester, a director of the Blackpool and Fleetwood Tramroad Company, also welcomed the delegates, and apologised for the absence of Mr. George Richardson, the chairman of the company, who was kept at home by sickness. So far as their company was concerned, he was happy to say that their undertaking had been pretty successful from the start, and its success was likely to grow each year. They had nothing to fear beyond the ocean and the erosion of the coast, and he was hoping that something would be done to guard against any danger there. Their success was largely due not to the board of directors, but to the management. Their manager, Mr. Cameron, had been with them ever since the line was b rn, and he was going to remain with them till he died. (Hear, hear, and laughter.) Nothing would tempt him to leave Blackpool. The directors never needed to take counsel's opinion when anything was going on in the

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way of litigation. Mr. Cameron was his own counsel, and the line had come to be known as Cameron's line. There had been dreams of a line running through from Fleetwood to Southport, and he thought that might have been brought about long ago by a combination of interests, but with sea and sands, and other things, to contend with, nothing had been done. The Blackpool-Fleetwood tramroad was started about 15 years ago on the American system. The principle in England was to put tramways where there were plenty of buildings, but the system in America was to build a tramway in a promising part and the houses would follow. That had been so in their case along the greater part of the route, and he felt it was rather a pity that they did not own the land on either side of the line. (Laughter, and hear, hear.) If they had been able to see a little bit further into the future, they might have purchased it. (Laughter.)

Mr. C. E. Riding (secretary of the Blackpool, St. Anne's, and Lytham Tramways) added further words of welcome to the members of the Association. He thanked the Mayor for the kind reference to his company, and said he was glad to hear that there was a record number of delegates at the Conference, but then Blackpool itself was always a "draw." He did not think that the directors of the Blackpool and Fleetwood need bother much about coast erosion, because he understood that if the sea got under the land Mr. Cameron was going to run it on stilts. (Laughter.)

The Chairman, in reply, expressed appreciation of the cordial welcome and the kind wishes for the profit, pleasure, and enjoyment of the members while in Blackpool. He regretted that the Hon. Arthur Stanley, M.P., the chairman of the Executive Council, was unable to be with them that morning. Parliamentary and other duties took up much of his time, and at this season of the year it was difficult for such a busy man to be absent from London. Mr. Stanley would, however, probably be with them in time for dinner in the evening. The Tramways and Light Railways Association was formed in the year 1897, and for some time they pursued the even tenor of their way, making no great stir in the world. The Council, dissatisfied with this condition of affairs, resolved to pursue a more progressive policy, and the first and most important move was to secure a chairman with some interest in tramway matters, and general influence. They succeeded beyond their rosiest anticipations, and in the Hon. Arthur Stanley, M.P., they found a chairman who had done wonders for them, and who to-day was held in regard, esteem, and affection by every member of their body. Their next step was to find a tactful and energetic secretary, and they had to thank their chairman again for introducing Mr. de Turckheim, who had proved himself a glutton for work, and splendid in his efforts to make the Association the success it was to-day. This was the fifth Congress they had had since the movement among the dry bones took place, and it promised to be the most successful. They had previously met in London, Dublin, Edinboro', and Swansea, but they anticipated that Blackpool would outshine them all. (Hear, hear.) There might be other opportunities of expressing their opinions upon the charms of Blackpool, and upon the public-spiritedness of its leading citizens, who had created a wonderful town. Speaking as one who had known and appreciated Blackpool from its infancy, he could tell those who were making their acquaintance with the most progressive pleasure resort in the world that the hospitality of the Blackpool people, the warmth and sincerity of their welcome was only equalled by their business capacity, and the courage they had displayed in the building of their city. (Applause.)

The Mayoral party then retired, and the business of the Conference was commenced.

## THE CONFERENCE.

The Chairman expressed his gratification at seeing such a large attendance, because it showed the interest taken in their efforts to benefit tramways generally, and the healthy and vigorous condition of the Association. They owed a deep debt of gratitude to the three tramway friends they had in the district, Mr. Furness, Mr. Cameron, and Mr. Laing, for what they had already done in enabling the council to present such a programme. (Hear, hear.) He regretted that he had one sad duty to perform—he referred to the sudden death of their old, generous, and faithful friend, Mr. J. W. Courtenay. In the early days of the Association, when they were almost overwhelmed with debt, Mr. Courtenay made it possible for them to continue their existence. At that time he provided a room for their council meetings, and, indeed he did more than any other man to keep the Association going. To those who enjoyed Mr. Courtenay's friendship, his death had left a void, and they could not yet realise that another of the old stalwarts had passed away. He moved

> "That the members of the Tramways and Light Railways Association assembled in Congress tender to Mrs. Courtenay and family their sympathy and condolence in their sad bereavement, and desire to place upon record their appreciation of the work Mr. Courtenay has done in times past for this Association."

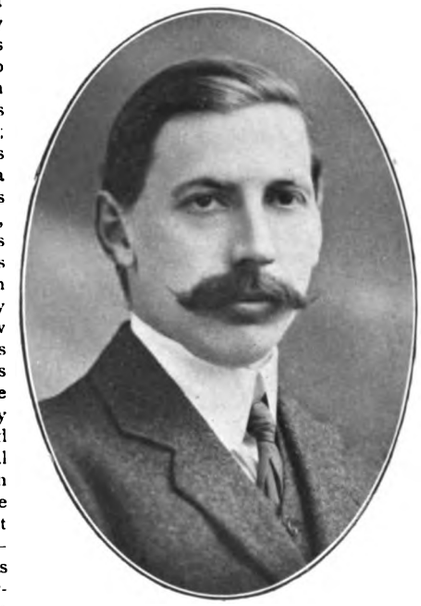
The resolution was passed in silence, all the delegates standing.

The Chairman then called on Mr. Edwardes to read the first paper, which was as follows:

# POSSIBILITIES OF INCREASING PROFITS ON INTERURBAN TRAMWAYS.

By E. H. Edwardes, A.M.I.E.E.
*(General Manager, Lancashire United Tramways Company).*

It is almost impossible in submitting a paper to an Association of this character to strike an original note, and I am not at all sure that such an aim is desirable. Tramways are a work-a-day proposition, and we can only review our experience and practice with an eye to detect here and there every opportunity for development and betterment. I have headed my paper "Interurban Tramways," and in doing so I mean more especially systems that traverse long stretches of country roads, passing through small manufacturing towns and villages, and connecting up with large municipal undertakings. Systems of this character have a wide sphere of usefulness, and it is difficult to imagine how a district so served could dispense with them, though in many cases they have proved a bad investment. Many miles of such tramways were constructed some 10 or 15 years ago with an optimism as to dividends which is now pathetic; but the transit facilities created have become a necessity in the districts through which they run, and it is of such systems that I venture to express my views. They are in such districts the only form of transit, and new schemes and extensions can only be sought in this direction, as our large cities are now mostly equipped. I am inclined to think—and, as general manager of a system such as I have indicated, have perhaps some little right to express my opinion—that one of the mistakes of management of interurban systems is an endeavour to vie with wealthy municipal undertakings. The different conditions are obvious. Mr. McElroy, in a recent report on the Manchester system, is chiefly concerned as to how to cater for his excess of passengers, whereas the problem before us is how profitably to cater for the few.



Mr. E. H. Edwardes.

The two main objects that we have always before us are the possibilities of decreasing our costs and increasing our receipts. Running costs have now become practically standardised, and it is only by the most rigid economy that one manager can show a few points of decimals below another. For the purpose of this paper I will divide these costs under the five following heads:

1. Electrical Energy;
2. Wages;
3. Maintenance of Cars;
4. Maintenance of Track;
5. Maintenance of Electrical Equipment of Lines;

and attached is a schedule taken from twelve typical undertakings showing the proportion these costs bear to the total running costs. I do not propose to deal here with the costs of generation of electricity, as a great many undertakings have to purchase their electrical energy, and are therefore only concerned with the efficiency of motormen, a subject which has been ably dealt with at previous Congresses. Again, there is little to be said with reference to the wages of employees, which are more or less fixed for us; and although they may appear high in comparison with other trades, we have a decided advantage of a higher and more efficient type of man; but I am inclined to the view that the elaborate and expensive uniform is unnecessary, and that in such directions as this, small towns and country districts should not be obsessed by the practice of large cities. Even the London General Omnibus Company have not yet considered it necessary to adopt full uniform, and there is no outcry in the West End. They receive an enormous patronage, and are a profitable concern.

I shall now briefly deal with the three chief maintenance charges, and from the schedule attached it will be seen that the highest of these is maintenance of cars, and, in my opinion, an enormous amount of money is wasted in this direction which is entirely unnecessary. I refer more especially to the upkeep of car bodies. They are gorgeously painted in the most expensive style, covered with transfers both inside and out, lined where possible with gold, and decorated inside with the finest figured wood. In addition, there is a quantity of unnecessary

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brass hand railing (which is a considerable item in itself to keep clean) and many other superfluities. The initial cost of these luxuries is little considered at the time of the construction of the tramway system, but the yearly burden of maintenance is far more serious, especially to those of us who attempt to keep up this high standard of beauty. It might be necessary in our large cities, but utility is the main thing we have to consider in an interurban system, and an absolutely plain

**COMPARISON OF RUNNING COSTS OF TWELVE TYPICAL UNDERTAKINGS.**

| | Cost of Current to Cars. | Wages, including Uniforms. | Maintenance of Cars, including Cleaning. | Maintenance of Track. | Maintenance of Electrical Equipment. | Total. |
|---|---|---|---|---|---|---|
| Local Authorities: | % | % | % | % | % | % |
| No. 1 .. | 32·1 | 36·6 | 22·7 | 5·7 | 2·8 | 100 |
| „ 2 .. | 28·8 | 41·6 | 20·8 | 5·8 | 2·8 | 100 |
| „ 3 .. | 39·9 | 34·6 | 16·1 | 7·0 | 2·2 | 100 |
| „ 4 .. | 36·3 | 43·2 | 13·1 | 4·7 | 2·7 | 100 |
| „ 5 . | 34·6 | 37·5 | 17·9 | 8·3 | 1·5 | 100 |
| „ 6 .. | 31·9 | 42·7 | 19·4 | 3·7 | 2·1 | 100 |
| „ 7 . | 34·9 | 41·1 | 16·8 | 3·8 | 3·4 | 100 |
| „ 8 .. | 36·7 | 39·5 | 16·8 | 4·2 | 2·5 | 100 |
| „ 9 .. | 30·0 | 37·5 | 17·7 | 9·2 | 5·5 | 100 |
| „ 10 .. | 31·6 | 38·7 | 20·1 | 6·9 | 2·7 | 100 |
| Private Companies: | | | | | | |
| No. 11 .. | 21·1 | 44·9 | 19·7 | 11·2 | 3·0 | 100 |
| „ 12 .. | 21·4 | 43·1 | 18·2 | 12·9 | 4·4 | 100 |
| Average .. | 31·6 | 40·1 | 18·2 | 6·9 | 2·9 | 100 |

car, built as much as possible of iron, and painted plainly is all that is requisite. The saving in the initial cost for an efficient car would not be much, but in the upkeep would be considerable.

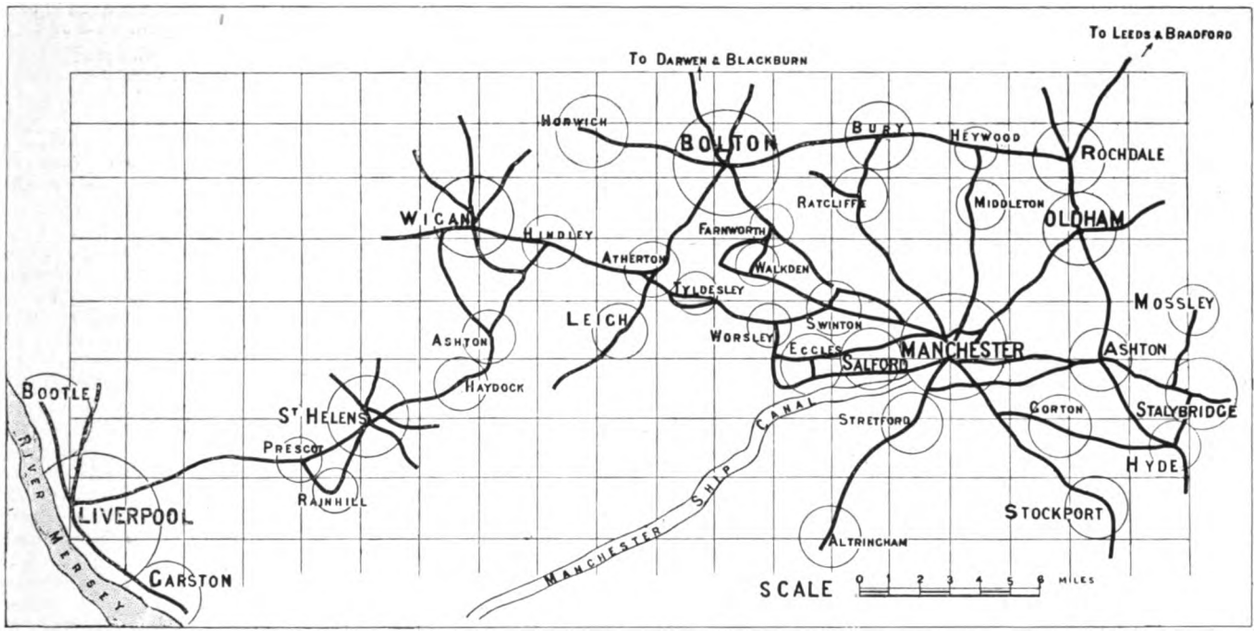
The cost of maintenance of car bodies is somewhere in the neighbourhood of 30 per cent. of the whole car and equipment, and therefore any reduction in this direction is well worth considering. I quite realise that many of you who are responsible for the comfort of travellers in all sorts of delectable spots in the south will be indifferent to my views on this subject, and, of course, there is a vast difference between long miles of tramways in the Black Country, where the majority of travellers are workmen, and popular suburbs in London, or at fashionable sea-side places; but I do advocate a more considered economy, and think a tramcar is an object of utility and can never become a thing of beauty.

With regard to the maintenance of track, I should like to refer to a very interesting paper on "permanent way" read by Mr. Hooghwinkel at the Edinburgh Congress. He suggested that by lightening the cars it would be possible to reduce the cost of track construction. I do not think this is the remedy. The wear of track and paving, especially on interurban lines, is largely due to the ever-increasing motor traffic, which takes advantage of our well-paved tramroads. This is especially noticeable on a road where the car service is not frequent, and where motor lorries can travel a considerable distance before being rung off the track by an approaching car. In many cases it saves time and a possible smash if the cars actually wait in the turn-outs for the motor lorries, giving the lorry the benefit of our road. The number of these vehicles which travel our roads at the present is considerable, and is increasing every year. It therefore appears to me that rather than cheapen our track construction it will be necessary to spend even more money on it than we do at present; and we can only hope that legislation will enforce the owners of motor vehicles to contribute towards the maintenance of our roads, or we must drive them off by healthy competition. This subject I propose to deal with in the second half of my paper.

On the subject of maintenance of track it might be of interest to mention here that one of my companies has recently entered into an agreement with a neighbouring district council, whereby the latter undertake to maintain the whole of the paving of the track for the entire period of the lease of 35 years for a yearly amount based on half the estimated cost of this maintenance, on the understanding that the company carries out certain extensions through their district within 12 months. This is a notable departure from the practice of local authorities in their dealings with tramway companies in the past, and is, I trust, an indication to become general, that those who have supplied facilities for transit that have become a public necessity should not be unfairly handicapped in their enterprise. The council I refer to will now have a tramway, which they are most anxious to get, and they will start with a granite paved road on six inches of concrete against an inferior paved grit road on ashes.

There is very little to be said about the electrical equipment of the lines, as this department is the cheapest and, therefore, the most satisfactory; but even in overhead construction there is room for extravagance. For instance, span work where bracket construction would do; poles with ornamental bases and collars, which are both detrimental to the poles; massive finials, which are often a source of danger; elaborate scroll work on the bracket arms, which is expensive but not good enough to be artistic—I hope I shall not offend some of my manufacturing friends. Such items, although apparently of small importance, all go to increase the maintenance account; and I know of one system where they actually spend annually 15 shillings per pole in picking out the ornamental fittings with gold.

One of the most difficult problems that an interurban manager has to consider, and which more or less affects my preceding remarks, especially wages, is the consideration of the most efficient car service. Much has already been written on the subject, and it has been said that anything less than a 15 minutes' service is unprofitable. This may be true as a general thesis, but what some of us have to consider seriously is whether we lose less with a 20 or even 30 minutes' service than we do with the former. My opinion is that a 10 or 20 minutes' service is often infinitely better than a 7½ or 15 minutes' service, for the simple reason that the former is an easier multiple of time. I have known instances where both 7½ and 15-minute services were changed, respectively, to 10 and 20-minute services, and not only was there a considerable saving effected in wages and maintenance, but there was also a considerable increase in receipts.




**Plan of Interconnecting Electric Tramways Systems of South Lancashire.**

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### CARRIAGE OF GOODS.

I venture in the second part of my paper to make some suggestions as to the possibilities of increasing receipts. Taking for granted that the most profitable fares available have been fixed, and the conditions of the line and services meet all the local requirements, the one method of increasing receipts is to extend the scope of the system's usefulness, for instance, by catering for the carriage of goods. I approach this subject with some trepidation. Numerous capable papers have been written about it, and it has also been discussed at some considerable length at our various meetings for the past 15 years; but to the best of my knowledge it has never been given a practical trial, and no regular service of goods haulage has ever been established in connection with any of our tramway systems. It appears to me, however, that this is a most opportune moment—at this Lancashire Congress—to bring the subject up once more before our members, in the hope that a useful discussion will follow, for there is little doubt that if the carriage of goods on tramway systems is possible anywhere it is possible in Lancashire. I have already spoken of the steadily increasing carriage of goods that has taken place yearly by motor lorries, and the detrimental effect such traffic is having on our track. I have taken the opportunity of obtaining particulars of the motor traffic between Bolton and Manchester, and find that on one road alone there passed in one day 150 motor lorries, 50 per cent. of which had trailers, and I believe that this time next year the number will be doubled. Facts such as these force themselves upon our notice, and I feel the consideration of a proposition that we should carry the goods ourselves well worth while. If by the use of our own trucks on our lines we could even pay working costs and interest on capital, the longer life of our permanent way would be a considerable recompense.

From reliable figures I find that the carriage of goods by motor lorry—more especially cotton and cloth—costs about 4½d. per ton per mile, and I gather that many of the motor-carrying companies are not in a very strong financial position; and it appears to me that if the price of petrol continues to increase at the same rate as it has done for the last 12 months, this figure will also have to be increased. Surely a carefully and efficiently organised system of electric wagons with two or three trailers carrying about eight tons each, would enable us to improve on this figure and also to make considerable profit.

The greater proportion of this haulage would have to take place during the night, whereby our electrical installation would be working throughout the whole twenty-four hours, and the load factor at our central stations be considerably improved, which is an item alone to be considered. Attached to this paper is a diagram showing the tramway systems which connect up to one another round Manchester and Liverpool. I have taken this district not because it is the only district with a complete tramways system in England, but because it is as large and as complete as any, and also by reason of this Congress being held in the county of Lancaster this year. The towns shown on this diagram are those which are actually at the present moment connected by tramways, but by connecting up lengths, such as between the two systems of Rochdale and Halifax, or Bolton and Blackburn, a very large increased area could be included, and there is no doubt that an extension of this nature would be made if the carriage of goods came into force. I do not propose to go into the figures with reference to the millions of tons of goods which are carried from the Liverpool and Manchester docks through this area, but it is obvious to all who examine the diagram the extraordinary possibilities presented by the adoption of these lines for the carriage of goods.

There are, of course, other important points to be considered in favour of this method of carrying goods, besides the question of competition with motor lorries. At present, in many of the manufacturing districts of Liverpool, it takes from a week to ten days before the mills and factories can obtain goods from the docks, for the simple reason that owing to the enormous congestion of traffic the railway companies are unable to cope with the ever increasing demand, and we have complaints from shippers of the inability to get their steamers unloaded, and complaints from manufacturers of their inability to get goods. Therefore I feel sure that any proposition put forward would be well received by both shippers and manufacturers. The advantages of this course would be obvious if the goods could be unloaded direct from the steamers on to electrically hauled wagons, and taken direct to the mills or warehouses, but I do not know how far this would be practicable. I have gone into the question very carefully with a great number of manufacturers, and have found that the small amount of tonnage handled in a mill or factory during twelve months would not pay the interest and sinking fund in connection with the erection of a siding for carriage of goods into every mill, but I see no reason why central goods yards should not be established in the manufacturing areas, and the goods transhipped on to motor or horse lorries and delivered by them to the various mills. By the adoption of box trucks and proper lifting tackle, this could easily be accomplished at a very low cost, and the goods which have been brought during the night could be distributed during the day. If such a scheme could be adopted I am of the opinion that a fair return would be obtained on the capital outlay, the tramways would be in operation for the entire 24 hours, and motor traffic would be largely discontinued over the tramway tracks.

I must apologise for presenting so bare and crude an outline of a scheme such as I suggest, but I hope it may invite discussion that may lead on to some practical result. Of course, such a scheme could only be possible by the co-operation of all adjoining tramways.

## THE DISCUSSION.

Mr. E. A. Paris (managing director of the Yorkshire (Woollen District) Electric Traction Company) said that he, as the managing director of an interurban tramway, and all others who occupied similar positions, must thank Mr. Edwardes for bringing the question forward in the way he had done. He would refer to one or two matters regarding running costs mentioned by Mr. Edwardes. The author said that running costs were practically standardised. Well, they were to a certain extent, but when they dissected them according to the five headings given by Mr. Edwardes, there were many discrepancies, although the total sum very nearly approximated. Electrical energy generated by a company or corporation could be produced per car-mile at 1d. to 1½d. cheaper than they had to pay to some four local authorities where their tramways ran. That would mean a very big saving to them if they produced their own electricity. Under the second item, wages, they were in a very awkward position. Those who worked for them wanted more money. Those horrible eye-disturbing things called picture palaces were running away with a lot of the money, and in order to keep things going, the men were asking for more wages. It was the tendency of the age, he supposed, and they would have to submit to it. He was surrounded by Corporations who paid higher wages than they, as a company, were able to do, seeing that they supplied a comparatively sparsely-populated district. Their receipts were 9d. per car-mile, as against 11d. in Halifax and other places, and it was difficult for them to pay the old sum they had been paying previously. They had had to face the problem and the increase in wages, and he saw calamity in it. He was afraid wages were going to be still higher, and the question to be considered was how they were going to recoup themselves. They were tied by iron bands by the Acts. They could only charge so much a mile, similar to the railway companies, but the railway companies had a loophole of escape by their goods tariff. The tramways had no goods traffic, but Mr. Edwardes' paper showed them the way, though the district Mr. Edwardes had sketched out in Lancashire was very different from his own. Thirdly, regarding the maintenance of cars, Mr. Edwardes was quite right in his remarks there, though he did not like his saying that a car was not a thing of beauty. Personally, he had done away with polished brass rails for some years to save wages and materials and the expense of cleaning. He had done away with the beautiful gold lining, because he had never found that people went into a car on account of there being gold lines inside and out, but because they wanted to travel a certain distance. Still he had the transfer of the magnet, which was very pretty, on each side, and it only required the transfer of the crown to make them believe that it was the royal carriage passing through the streets, except that it was painted green instead of blue. (Laughter.) The track was a very serious item. As they got older, the tracks became more dilapidated. The Act of 1872, which made the undertakers repair the track, was made because in those days the cars were drawn by horses, and the track was naturally destroyed by them.

Nowadays, however, the track was not destroyed by the running of the cars; for they only used the rails. Other heavy traffic with which they had nothing to do destroyed the track for them, and yet they went on year after year promoting tramway bills with all these old-fashioned liabilities hanging on to them. It was like taking up an Act of Edward III. under which, if they stole a sheep, they were liable to be hanged. (Laughter). That was not so nowadays, so why should they be called upon to pay for a track that they did not wear out. Lately, a prominent electrical engineer who knew their needs and requirements had been returned to the House of Commons, and he hoped that Mr. Hamilton's knowledge of the disabilities that the electrical industry in this country was saddled with, in comparison with other countries, would lead him to put his foot down. Perhaps then they would see some alteration in this most unjust burden upon tramway undertakings.

He had ruminated over the problem of the carriage of goods for the last 10 years and he had got out statistics of the various mills in his district and the goods and raw material they had, but he could not see his way afterwards. The tramways shown in Mr. Edwardes' plan had advantages that they did not possess in the West Riding of Yorkshire. The undertakings that Mr. Edwardes alluded to had a 4 ft. 8½ in. gauge and could be physically connected; but in the district that he (Mr. Paris) represented, they had no less than four different gauges, 4 ft. 8½ in. in Leeds, Wakefield, Ossett, and the Yorkshire Woollen, 4 ft. 7¾ in. in Huddersfield—a singular gauge—4 ft. in Bradford, and 3 ft. 6 in. in Halifax. How were they going to run their cars through all those? It would tax the ingenuity of the inventor of the change-gauge truck (Mr. Spencer) to make the same car change gauge for 4 ft., 4 ft. 8½ in., 3 ft. 6 in., and 4 ft. 7¾ in.

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Goods traffic in that way in the West Riding would be impossible. In Lancashire, on the other hand, it seemed the ideal thing, and ought to be attempted. He might assist Mr. Edwardes by showing him how they dealt with parcels, the smaller part of the goods traffic. They carried parcels from Leeds to Bradford. The Leeds Corporation had nothing to do with parcels, so they could not be carried on that line to Bradford. However, they were carried in a very roundabout way—from Leeds to Wakefield, Wakefield to Ossett, Ossett to Dewsbury, and then on to Bradford. They had had that system for many years, and it had been successful. The collecting company got a first charge and the distributing company got a first charge, and the various towns through which the cars were run got their proportion according to mileage, which could all be settled in a common clearing house. It worked very smoothly and evenly. He had a slight grievance about not being paid enough, but that was owing to their having to do rather more in connection with the transhipment of parcels than any others. There was a break of about 200 yards between the Ossett cars and their cars, and he had to keep a boy to bring on the parcels, book them, and send them on to Bradford. If they were connected up, they could simply transfer them. The whole question of goods traffic was one that provided plenty of food for reflection.

Alderman F. SMITH (chairman of the Liverpool Tramways Committee) said he was glad to have the advantage of the paper Mr. Edwardes had read, and the suggestion contained in it. The proposal in regard to the carrying of goods was excellent. He thought they should make one tramway line abut upon another, even if they had not the same gauges. Regarding the question of wages, he did not think they would ever reach finality. Did they ever want to reach finality in their receipts? Well, Liverpool did not. Their receipts were nearly £1,500 better than last year for the week ending June 7. If the ability possessed by members of the Association was seriously directed to the solution of the problem of the difficulties surrounding the extraction of goods from the docks and carrying them to the nearest point of consumption, they would indeed have done something for which the community would have cause to be extremely grateful. They all desired that the best should be done for the manufacturers of the country, and they must have no vain questions of whether motors were running on their rails and taking out a little bit of their pavement, or whether they were putting down a little bit more than they should do. They must take the law as it was until they could get it altered, and run their undertakings so that they could do enough, first of all, to keep them sound, and then do the best for the public interest in every direction. One of these interests was the carrying of goods from the port of Liverpool all over Lancashire.

Mr. W. CLOUGH (manager of the Bury Corporation Tramways) said that Mr. Edwardes divided the running costs of 12 tramway systems under five heads. He recognised that this table was not intended as a comparison of these 12 systems, but of the ratio of expenditure in each case. He could not at all understand what use the author intended to make of the table, and he would be glad if Mr. Edwardes would fully explain the inferences that were to be drawn from these percentages of expenditure. Assuming the figures to be correct—and this was questionable - the two companies showed up badly in the ratio of expenditure, both on track and overhead equipment as compared with cars, but especially as regards the track. No doubt this feature of the table had presented itself to the author, who might have some explanation to give to them. The only one he could think of was that these companies in the past had not sufficiently maintained the track and that they were now having to meet an increased expenditure. With regard to the maintenance of car bodies, he was prepared to admit that they had reached what ought to be the limit as regarded ornamentation, but he would point out that even in the black country it might be more economical to have the interiors of cars finished with what the author described as the "finest figured wood." When interiors were finished in the style Mr. Edwardes condemned they only required to be periodically cleaned and varnished, which was much less costly than repainting in the style that Mr. Edwardes recommended. To some extent this also applied to the outside panels. They might do without the transfers, even without the "magnet" and the gold lines, but the very fact that the bodies were so well finished in the painting and varnishing rendered the nightly cleaning much cheaper than it would be if they were finished more in the style of a furniture van. (Laughter.) He had taken out the figures for both classes of work, and found that the reduction in cost that Mr. Edwardes suggested was small in comparison with the extra cost of maintenance and cleaning that would be entailed. Mr. Edwardes also stated "my opinion is that the 10 or 20 minutes' is often infinitely better than the 7½ or 15 minutes' service for the simple reason that the former is an easy multiple of time." This he certainly could not agree with, and he thought Mr. Edwardes should look for some other cause when he said that a reduction from 7½ to a 10 and from a 15 to a 20 minutes' service gave an increase of receipts. He could not understand how it was possible, by reducing the number of cars on a route, to increase the receipts. If they admitted Mr. Edwardes' contention they must either give a 10 minutes' service or a 20 minutes' service. There was a big difference between six cars an hour and three cars an hour. A 20 minutes' service might be insufficient and a 10 minutes' service too frequent—indeed the most profitable service might be one of 12 or 15 minutes. He admitted that when they got services at 6, 7½, and 8 minutes' intervals there was a difficulty in reckoning up the times of the cars, especially in the case of the 8 minutes, where it was not the same time after each hour, but he would not for one moment allow such a difficulty to prevent his arranging the exact time table which the traffic required, run with the least number of cars and the least possible running time. For instance, take a route on which the running time was exactly 60 minutes. Six cars gave a 10 minutes' service, but these six cars might be proving insufficient to carry the number of passengers, and if they were to adhere to Mr. Edwardes' principle of an easy multiple there was only one course open, and that was to put on another six cars and give a five minutes' service, which might make all the difference between a profit and a loss on the route. Surely the most economical course would be to put on another two cars and give a 7½ minutes' service.

Turning to the second part of Mr. Edwardes' paper, they came across their old friend "the carriage of goods on tramways," which Mr. Edwardes suggested might help them in two ways, firstly by increasing the receipts, and secondly by driving off the road motor vehicles which did so much damage to the tracks. They were all anxious to increase their revenue, and that morning, instead of opening out idealistic visions of the advantages to be derived from the conveyance of goods, let them look at the difficulties they would have to overcome before they could secure any of these advantages. Mr. Edwardes said he did not know how far it would be practicable to unload goods direct from the steamer on to electrically-hauled wagons and take them direct to the mills and warehouses. They might take it for granted that there was no prospect of getting tracks and overhead equipment installed into the dockyards and railway sidings, or into the mill yards and warehouses. Even if the wheels of the tramway vehicles were suitable to run on railway metals it was impracticable to have tramway vehicles so heavily constructed as to stand the shunting on the railway and dock sidings. Seeing that the tramways approached this question as competitors with the railways, the railways could not reasonably be expected to give the tramways any facilities. If, however, the railways and the tramways were prepared to work a combined scheme, it would be possible to devise a means of conveying a railway wagon and its contents out of the railways siding direct to the mills or warehouses. At the present moment, he had under consideration the conveyance of coal wagons from a private siding to a proposed coal yard, a distance of five miles. It was proposed to construct a tramway track as a short extension of the railway track, but at a lower level, and to run the railway wagons on to shallow tramway trucks, and so convey the railway wagon along the tramway. The first precaution was to get the centre of gravity sufficiently low so as to run no risk of overturning the wagon when passing round curves, and, strange to say, the adoption of the 4 ft. 8½ in. railway gauge for tramways gave rise to the first trouble in this respect. Had the wheels of both trucks not been of one guage, the tramway truck could have been constructed with a less height from the ground.

Co-operation between railways and tramways was out of the question, therefore it would be necessary to have central goods yards in the various towns Now supposing the tramway authorities formed a joint board, with goods warehouses throughout the manufacturing districts of Lancashire, the tramways would be in the same position as the railway companies were in to-day. On the one hand they had a set of warehouses or depots connected by tramways, on the other hand they had a set of warehouses connected by railways, with the admitted additional advantage in the case of the railways that there existed facilities for the exchange of goods, and that they were able to get into the warehouses alongside the docks. The only way in which the tramways could possibly secure any advantage would be in the cost of haulage. Could the tramways carry goods at a cheaper rate than the railways now charge? To answer that let them take a case in point. The railway was asked to convey 25 tons of cotton goods from Bury to Liverpool, a distance of 35 miles, and quoted a rate of 10s. per ton, station to station—a sum of £12 10s. To convey this 25 tons by tramway would require three vehicles, because they must remember the bulk as well as the weight of the material. One vehicle fitted with electrical equipment would cost, say £750, and the other two, without electrical equipment, £500 each, which meant a capital outlay of £1,750. Given a 10 years' life, and the money borrowed at 3½ per cent., there was an annual charge of £236 5s. for interest and depreciation, which, provided the vehicles were in use six days per week, equalled 15s. 9d. per day. The wages and expenses of two men taking the vehicle to Liverpool would be 7s. 6d.; the cost of electrical energy, at one unit per vehicle per mile, at 1d. per unit, would be 8s. 9d.; and maintenance and repair of vehicle, at ¾d. a mile, would run to 6s. 7d.; mileage to be paid to other authorities, at, say, 6d. per car-mile (which was sufficient to cover the wear and tear of track and overhead equipment), would be £2 12s. 6d., making a total cost of £4 11s. 1d., providing that there was a return load. If the vehicles had to return empty, there required to be added wages 7s. 6d., energy 8s. 9d., maintenance and repairs 6s. 7d., mileage £2 12s. 6d., total

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£3 15s. 4d., or £8 6s. 5d. for the double journey. Compared with the present charges of the railway companies, this left a balance of £4 3s. 7d. with which to pay for the cost of warehousing at each end of the line.

Take the same case, with the goods conveyed by motor. At Mr. Edwardes' figure of 4½d. per ton per mile, this represented £16 8s. 1d., but for this amount the goods were conveyed direct from the mill at one end to the shipping warehouse at the other end Therefore to compare the costs there must be added to the tramway costs the expense of carting and handling at each end of the line. One mile of cartage at each end would be a fair average - say £2 10. The tramway cost would therefore be increased to £10 16s. 5d., leaving a balance of £5 11s. 8d. in favour of the tramway as against the motor, plus any addition that might come from a return load. He had not overlooked Mr. Edwardes' statement that the greater part of this haulage would have to take place during the night, and that between 11 p.m. and 4-30 a.m. there would scarcely be time to travel the 70 miles of the outward and return journey. This difficulty, however, might be overcome by an exchange of crews, which would be quite possible if worked under a joint control. He believed, with Mr. Edwardes, that now the railway rates had been so much increased, and with the increasing cost of petrol, the tramways were to-day in a position to compete successfully with either the railways or motor haulage, and he would be quite prepared to meet with others to consider whether a joint board could not be formed to take up this additional means of revenue. One of the first questions they would have to ask themselves would be as to whether the tramway authorities had power to enter into this work. This was so in the case of his own system provided that not more than 4d. per ton per mile was charged.

Mr. J. W. Dugdale (general manager of Oldham Corporation Tramways) said the haulage of goods on tramways was a matter that should receive the careful consideration and thought of every tramway manager in the country. Especially did it apply to those who were situated in Lancashire and Cheshire. He came from an important spinning district that relied absolutely upon raw material being delivered to the mills. It might be of interest to know that in this parliamentary borough there were 89 cotton mills, with 6,250,000 spindles, while in the Oldham district there were 197 mills, with 14,750,000 spindles. The amount of raw material used in Oldham was 5,000 tons a week; also 1,700 tons of raw material were brought by road from Manchester to Oldham. The total quantity of yarn despatched by road from Oldham to various places amounted to 2,500 tons per week, and the quantity of yarn despatched by road to Manchester was 1,000 tons a week. In Oldham they had 37 carriers who were members of the Oldham and District Horse and Motor Owners' Association, who had 298 horses and six motor lurries. These animals and motors were more or less employed in carting cotton. There were 16 cotton firms with 62 horses that did nothing else but cart cotton, and there were always a large number of coal dealers also who contracted with cotton firms to carry the goods to and from Manchester and district. With all this heavy material passing over their lines, there should be an opportunity to garner in some of this revenue. He thought the difficulties with regard to getting to the sidings might be easily overcome.

Mr. C. D. Stanley (St. Helens Tramways) said he cordially agreed with that part of the paper where Mr. Edwardes dealt with small matters, such as superfluous decorations, and so on. Mr. Clough said that bright-painted cars attracted traffic. Did they? (A Voice: "Yes.") Perhaps in delectable districts in the south they did, but he was inclined to think that the one thing in Lancashire to attract traffic was a good and punctual service. He believed he could send cars out in St. Helens painted slate, and with the handrails painted black, and they would carry every penny of the traffic just the same as now, with the brilliant red paint, beautifully outlined with gold, and all the rest of it.

A Delegate: Will it stand?

He thought it would, for slate colour was less liable to be acted upon by fumes. He did not know which town it was where they spent 15s. annually on each tramway pole, but he agreed that it was a waste of money, and it was actually artistically wrong. A tramway pole was simply intended to be useful, a thing that should be strong, plain, and straight—elaboration was out of place. With regard to the service suggested, his opinion was that service was not determined purely by the actual number of cars required. On one section of the lines with he was connected they discontinued a 15 minutes' service, and put on a 20 minutes' service instead, with the result that the service was more popular, and there was an increase in the receipts. The reason was that loops were very bad in places for a 15 minutes' service. Another remark made was that co-operation between tramways and railways was out of the question. Well, he would question that very much. They in St. Helens ran a very successful system of through tickets to Southport, *via* the Cheshire Lines Railway, and it worked well and smoothly, and was very profitable. Now, if that was possible with passenger traffic, he should think it was not impossible with goods.

A Delegate: They are in competition.

Mr. Stanley: They are in competition, I agree. We are in competition at one point, but at another point the thing happens to fit in, and works very well. Referring to the latter part of the paper, it did seem to him, as between Liverpool and the manufacturing districts of Lancashire, that goods service was bound to come. He understood that some years ago, in one district, there was a difficulty owing to one of the local authorities being rather greedy they wanted a very large percentage; but whether that objection existed now or not, he did not know. He believed that there was a difficulty at one time of getting on to the docks, but seeing how shippers were crying out at the present time about the difficulty of getting goods away from the docks, he did not think that difficulty was likely to be of a permanent order. He did not understand Mr. Clough's suggestion as to the difficulty of shunting tramway vehicles; he himself would have thought that it would have been better to equip electrically the dock side so as to haul goods there. He quite agreed that there were difficulties in hauling goods, if there were not, the thing would have been an accomplished fact years ago. But he could not help thinking that if they put their heads together, and seriously tackled the matter, something could be done. (Applause.)

Mr. C. W. Shepherd (managing director, Edinburgh and District Tramways) remarked that as one who represented what he might term one of the freak tramways of the country- (laughter)—it had been very interesting to listen to the various electrical problems that had been discussed that morning. He was surprised at Mr. Edwardes' statement to the effect that changing from a 10 to a 15 minutes' service had increased his revenue. If they carried everything it was possible to pick up, he could quite understand the revenue remaining the same, but to increase the revenue with a decreased service, in his opinion, was impossible. There must be some difference in climatic conditions to account for this extraordinary problem.

This concluded the discussion, and the Chairman moved a hearty vote of thanks to Mr. Edwardes for his paper.

Mr. Edwardes, in response, said he was very much pleased with the way they had received his paper, and with the interesting discussion which followed. Referring to Mr. Paris' remarks, he apparently agreed with him (Mr. Edwardes) largely, if not almost entirely, in his few remarks in reference to the various extravagances some of them were guilty of; and, no doubt, the reason was that his undertaking was tarred with the same brush. (Laughter.) With regard to the carriage of goods, it certainly did increase the difficulty enormously where the gauges on the adjoining systems were different. He supposed that in Lancashire the gauges were the same; they were more sensible there than in Yorkshire. (Laughter.) They had an arrangement for the carriage of parcels in his area, but unfortunately the neighbouring authorities of Manchester, Bolton, and Liverpool the shopping area for the district—would not have parcels on their cars, which greatly reduced the takings. The discussion on the carriage of goods was certainly most encouraging, and far exceeded his expectations. The gentlemen representing three important centres —Manchester, Bury, and Oldham—seemed quite willing to form a committee to enter into the consideration of this subject, and he hoped that some useful purpose would be served from the remarks made that day. Especially were the remarks of Alderman Smith most refreshing, as Liverpool was undoubtedly the key to the situation. As for his friend Mr. Clough, he never expected for one minute that he would agree with him regarding the cars, because he believed that Mr. Clough's cars were the best painted in England. (Laughter.) He evidently bought from every manufacturer in the kingdom, for they all told him to see Mr. Clough's cars, when attempting to sell paint or varnish. (Renewed laughter.) But he seemed to have misunderstood him on one point. He mixed cleanliness with beauty. It mattered not if a car was furnished with pine, maple, or ash wood, so long as it was perfectly clean. Bright paint, beautiful gold lines, and transfers they might have, but it was "the varnish" that made cars easy to clean. As to the tables he had given, they were intended just to show roughly the proportion of expenditure in the maintenance of cars. Looking through the figures for the first 10 undertakings they certainly compared very well together, but the figures for the two private undertakings certainly varied in some respects, as, for instance, the cost of current. This was chiefly due to the fact that most local authorities bought current from one of their departments, and therefore paid more than the actual cost of generation. The "maintenance of track" figures seemed peculiar, he said, in regard to Mr. Clough's observations, but he would point out that the road authorities were more exacting in the payment for road maintenance than when they had to pay for the work themselves. (Hear, hear.) Mr. Clough, on the subject of the carriage of goods, had flooded them with difficulties, just as they had been for the past 15 years. The great difficulty of running on to railway lines, he thought, could be overcome. He did not see, for instance, in the case of docks, why tram lines should not be laid inside railway lines. Railway companies did not run sidings to mills. There were 100 mills or so in his district, but only one solitary mill had got a railway siding—everything was conveyed either by canal or horse or motor cartage.

The next paper was that on "Tramway Track, 1883-1913." This was introduced by the author in a brief statement which is given after the paper on page 21.

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# TRAMWAY TRACK, 1883 TO 1913:

## A RÉSUMÉ FROM A MANUFACTURER'S STANDPOINT.

BY FRED BLAND, M.I.MECH.E.

I must ask the kind indulgence of tramway engineers and managers, who are generally experts in "papers," for any irregularities that may occur in my own. I wanted to postpone my paper until another Congress, but your secretary has "the iron hand in a velvet glove," and he said a certain date, and would not argue further. Therefore it is with some "fear and trembling" that I, as a manufacturer, venture to place certain matters before you, trusting to your tender criticisms, believing that you will find something of interest, in which event possibly at a later date this history may be revised and completed, and form a pamphlet for reference files, dating as it does before many of you were tramway men, but at present the time at my disposal only enables me to give an historical review as expressed by the title selected.

I have endeavoured to avoid "advertising," but it was obviously impossible not to mention the firm with which I was associated, and who were, without doubt, the pioneers in English trackwork. I do not intend to go into details of track construction, its merits and demerits, or I should soon spring a "hornets' nest" about my devoted head, but rather to place before you the advances that have been made in tramway work in my own experience. Much of my paper may, of course, be "old news" to those of you who have studied the past, but there are many who no doubt will find something new. The late Sir J. Clifton Robinson claimed to have the largest intimacy with tramways generally, and I think I can say the same as far as track is concerned, as for the past 30 years I have been closely identified with tramway construction in the matter of supplying material.

Horse tramways existed for over 50 years. The honour of the first street tramway has been claimed by Birkenhead in 1860; but Belvoir Castle claims the first tramway, some portion of which could be seen some years ago. This line was constructed nearly 100 years ago for conveying materials when the Castle was rebuilt after a great fire. A still older tramway is claimed by a local colliery company near Sheffield, where iron plates were laid 200 to 300 years ago to enable the trucks of those days to be dragged out of the pit, and so we advanced to the present system of grooved rails and palatial cars. At all events tramways "existed" before our time, and here and there we come across relics of the ancient days—a single or double-deck car drawn by an ancient horse or a pair of fiery steeds. Liverpool was the first to obtain powers in 1868, and opened in 1869, then London, Glasgow, Dublin, and then came the Tramways Act of 1870 of blessed and unblessed memory.

In 1879 an Act for mechanical power on tramways, which authorised steam to be used, was passed, and was the commencement of the "steel point" era. Of course cable tramways had been laid in a few places before this, but they were rare, the first in this country being opened in 1884 at Highgate, the points and crossings for which were afterwards replaced with steel. At the present day Edinburgh stands proudly alone (if we exclude hill climbing cars). With the Edinburgh track construction in 1887 will always be associated the names of Mr. John Kerr and the late Mr. James More.

About 1882 my old firm of Askham Brothers and Wilson, Limited, saw before them a possibility of new business very different to their old work as steel manufacturers, and with great foresight and judgment decided to go into it. At that time the late Mr. Philip U. Askham was managing director, and he became aquainted with certain financiers who were taking up tramways as a financial speculation—as no doubt some of you will remember was very largely done in the eighties. I was in due course placed in charge of this work, and have remained identified with tramways ever since. Then came the day of the automatic point. The dummy point was found unsatisfactory, and the Board of Trade stipulated that an automatic point should be used upon all single lines of tramways where mechanical traction was to be used. After various experiments the "Marshall" patent point was produced, and laid upon several lines with which we were then connected. Other companies were induced to try these (frequently under free conditions), and the point was found to be so reliable that it was made the standard point, and was the father of all automatic points since that day, and still holds its own. The patent rights were purchased, a great trade followed (as the demand grew, extensive alterations were made in the old works, which were then adapted to the production of points and crossings, as apart from constructional work), and some thousands were turned out per annum.

### FIRST ELECTRIC TRAMWAYS.

In 1883 the first electric tramways at Brighton, by Magnus Volk, and the Giant's Causeway line were laid. Then the first serious track was laid at Blackpool in 1884-5, and my firm supplied the whole of the material for the conduit, consisting of channels, chairs and accessories, and the points and crossings, to the specification of Mr. Holroyd Smith, of Halifax, and there are portions of this old track still to be seen in side streets, and a section ought to be preserved for posterity to see the difference in conduit work in 20 years. Then came the overhead trolley, which opened out a new era for manufacturers of electrical plant, and doubled the demand for steel points and crossings, and the works for some years were at high pressure, turning out some scores of points and crossings per week.

In November, 1891, the first trolley line was opened in Leeds. I remember being present, and still have the medal subsequently struck. Leeds adopted the Marshall point, and their example was followed generally throughout the country. Then followed the Bristol tramways, constructed by the late Sir Clifton Robinson (whom I met on several occasions), and who afterwards built the Dublin and Southern and Middlesbrough tracks, and later on the London United Tramways. Then the South Staffordshire Tramways, which were opened on the New Year Eve of 1893. Mr. Carruthers Wain was the chairman, and there was a great gathering of the original Tramway Institute, of which I was then a member. The conduit system, an improved cable system so far as the ground plant was concerned, was adopted by the London County Council, but London was, and still is, the only place in Great Britain where this system is in use, but as I am dealing with personal experience only, I merely mention this in its proper order.

In 1896 came the Light Railway Act, and this again caused an increased demand for trackwork, 1898 to 1903 being years of great activity. America appears to have first used rails and flanged wheels in the streets, and when electric tramways were first introduced here it was thought that the best thing was to adopt American cars, American wheels, and American track. Now English cars are used, American wheels are practically abandoned, and English manufacturers can hold their own against American track material. Using American wheels of chilled iron was a retrograde movement (which has been proved by the general adoption of steel tyred wheels), because under steam traction all the engine wheels had steel tyres, and if chilled wheels were unsuitable for steam they were doubly so for electric cars, but America used chilled wheels, consequently we had to do the same. The writer was always opposed to these, and supplied the first steel-tyred wheels that were used—viz., in 1894, to the South Staffordshire Tramways Company, Limited—and in looking over some old papers I found a letter written on March 26, 1895, by Mr. Alfred Dickinson, who was then engineer to the South Staffordshire Tramways, and I have ventured to include it, not as a testimonial, but as a prophecy since fulfilled:

7 ft. 6 in. 1882. | 9 ft. 6 in. 1892. | 12 ft. 1902. | 15 ft. 1912.

*26th March, 1895.*

"DEAR SIRS,—Your letter of the 23rd inst. The records for the set of tyres show considerably over 40,000 miles. When the use of steel tyres for electric cars is more fully appreciated I feel sure that they will be exclusively used."

Steel-tyred wheels were supplied to Bristol in 1898, Halifax and Bradford in 1899, and in 1900 the question was discussed with Sheffield,



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because of the numerous fractures of chilled wheels in entering the points, which was one of the reasons for tyred wheels being adopted.

### SYSTEMS OF TRACK AND RAILS.

1. The earlier systems before 1870 were usually the "Box" rail, laid upon longitudinal sleepers, or on C.I. chairs, and this was carried forward up to 1890 upon many lines. The Sheffield track was entirely upon this principle, as we laid the first loop ends with girder rails in 1896, and this was an example of the country generally preparatory to electric traction.

2. The "Kincaid" system, as laid upon the old West Metropolitan Tramways.

3. The "Barker" system, as laid upon the old Manchester, Bury, Rochdale and Oldham Tramways, long since relaid.

4. The "Vignoles" system, as laid upon the North London Tramways and the North Staffordshire Tramways. Incidentally this rail shares with Dundee the honour of being the only two tramway rails ever rolled in Sheffield. This rail was designed by Mr. Henry Vignoles, together with Mr. J. W. Newton, the leading tramway engineers of that day.

5. Then crept in the girder rails, Dick, Kerr and Company, Limited, laying the Kerr system at Wigan, etc., upon continuous iron or steel sleepers, also upon cross sleepers. Bradford also had a similar type known as the "Winby and Levick." Then the girder rails gradually grew in size and weight from 45 lb. to 105 lb. per yard.

6. Then came the British standard rails, which now hold the market, if we consider that since 1907 125,895 tons of B.S.S. rails have been rolled in this country as against 38,537 tons of other sections. But these sections are again under revision by the Engineering Standards Committee; and as Liverpool have adopted a much heavier rail of 134 lb., and Leeds a section of their own, and Manchester also have slightly departed from the "standard," the word "finis" will not yet be printed.

When we consider that at one time nearly every tramway company had its own section of rail, as engineers, who had the purchasing powers wanted their own way, and generally got it (now, however, the British standard rail has stopped a great deal of this), I have ventured to show on the large wall plan a collection of these rail sections, which I can guarantee accurate. I think an examination of this plan will be interesting, and will show the progress in rails more than any written description, and at the same time will give you an idea of the number of different patterns then required to suit the various sections, and which alone is an answer to those who ridicule the statement that manufacturers want to standardise. At the time I refer to the only Corporation tramway was Huddersfield, and that was because no one would take the running off their hands. Now there are 99 municipal lines.

*Rail Joints.*—In the olden days fish plates were used, of all kinds, from ⅜ in. thick, and it is astonishing what little trouble the joints caused as compared with the present, and—I mention this with a whisper—corrugations were unheard of. Many tracks used the Marshall sole plate, 16 in. to 24 in. long, by ⅜ in. to ⅝ in. thick, by 10 in. to 12 in. wide, with clips and bolts to hold down existing rails, and with longitudinal strips bolted through the rail flange for new work, and in several cases when the lines were relaid these joints were found to be intact. Where electric tramways adopted these they had little trouble with the joints, *par exemple*, Nottingham, where the original lines were laid with these plates, which are still in use. Then came the inverted rail, the H girder, the cross rail, the C.I. anchor, the grip, and many others, especially when the rails began to be welded by the Falk, Thermit, Tudor, and other systems.

*Continuous Fish Plates*—These have been very rarely used, notably Derby, Birmingham, and a few odd places; but there is no doubt that they make a good joint on the main track, but are difficult to fit on points and crossings, and require special arrangements to be made.

*Tie Bars.*—These at first were flat bars, 2 in. by ½ in. to ¾ in., bent over at each end, and laid under the rail or chairs. Also angle bars, 2 in. by 2 in. by ¼ in., fitted with four clips, the outer clips being riveted on, the inside clips bolted on, and with a centre base plate to carry the girder rail. Channel bars, 2 in. by 2 in. by ¼ in., were also used in a similar manner. Then came the centre tie bars, screwed each end, as used at the present day, also tie bars with one slot end, but which necessitate extra road opening whenever the rail carrying the slot end requires relaying.

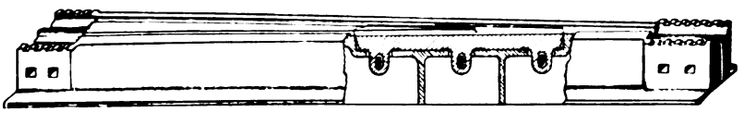
*Bolts.*—¾ in. was a common size, ⅝ in. was strong, and 1 in. was exceptional. Now 1 in. is a standard size; four bolts only were used against six and eight now. Iron bolts were commonly used, but we instituted mild steel bolts fitted with various lock arrangements—the Privet, a metal washer with a catch arrangement; the Grover spring washer, the Thackray, and then the Lock Nut, the Eureka, Helicoid, Keen and Ibbotson's.

*Drain Rails.*—In 1892 Mr. W. H. S. Dawson, the assistant surveyor of Bradford, brought out his patent drain rail, consisting of a C.S. rail, 6 ft. to 9 ft. long with box combined, which had a great sale, but fell into disuse because of the extra joints and harder material as compared with the running rail, simple drain boxes attached to the running rail being now the standard, either trapped or untrapped.

"Miller's" Chilled Iron with Fish Plates Cast in.

"Askham" Type Cast Steel Point.

Early Type Cast Steel for "Kerr's" System.

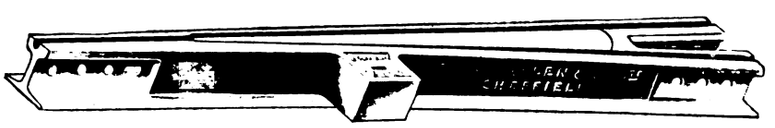


"Askham" Early Type Cast Steel Point for Girder Rails, Showing "Renewable Fillet."

"Dickinson's" Cast Steel Point with "Renewal Piece."

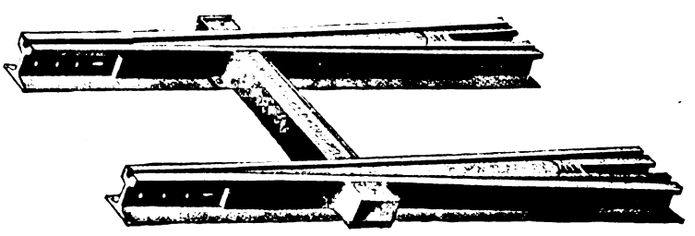
Points.—I. Ancient.

Cast Steel Point with Manganese Steel Insert (or without).



Solid Manganese Steel (Movable) Point.

"Continuous" Type of Point.



Double Movable Points, Solid Manganese Steel.

Points.—II. Modern.

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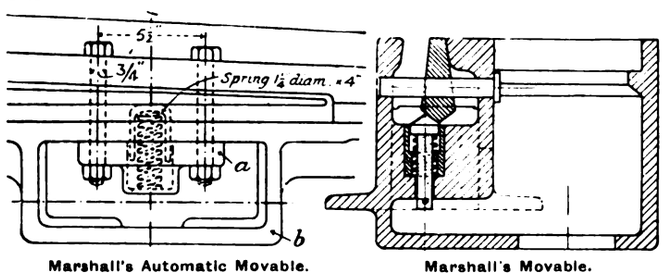
### POINTS AND CROSSINGS.

The seventies was the "Iron Age." Originally, chilled iron points were used, consisting of a movable and open point at junctions, such movable point having frequently a tongue of only 1 in. deep, and from 3 to 6 ft. long. At passing places, a dummy and open point were used, the dummy point being one through which the cars could *not* run, and merely consisted of one groove raised ¼ in. to ⅜ in., which sent the car to the left hand, and in running out the car "dropped off" into the running track. In many places both points were open, and the drivers pulled the horses half-way across the road until the car wheels had taken the correct road. In fact, anything was good enough upon some lines so long as the car could run *on or through* the point, and weird and wonderful were many local examples I have seen scrapped. Miller and Company, Limited, Edinburgh, were the principal makers, and their points ran far into the nineties upon many girder tramways where horse traction was continued, and I have to thank them for many courtesies extended to me, as a rival in past years. The first points used for steam cars were, however, on the same principle of dummy and open, but in many cases the dummy portion was a renewable insert fastened in by cotters (and not run in with spelter as inserts now are), and these I may say were the forerunners of insert work (nearly 20 years before the Americans placed their work in this country). I wonder what engineers would say now if they had to take up 34 ft. of rail to replace one point, which was often the case, because fish plates were frequently cast *in* the points and not fitted on the ends, but to renew crossings entailed even more road opening.

*Steel Era.*—As stated, chilled-iron points were the regular practice, but my firm at once placed on the market a crucible cast-steel point, which, while dearer, was tougher and more durable, and the first steel points used in England were laid upon the North Staffordshire tramways and the North London tramways, both of which concerns were constructed together. Then came the Manchester, Bury, Rochdale and Oldham tramways, the St. Helens, Wigan, Darlington and Stockton, Middlesbrough, and West Metropolitan tramways, followed by others. Nearly all points for the main track were then made straight, 7 ft. 6 in. and 8 ft. 6 in. long, radius points only being used upon sharp junctions and at depots, the curve being a true radius from the toe of the points. Crossings also, were all straight, but always of the frog type, whereas now they are chiefly "leg" ends, to ensure better joints. Where required for junction work they were made the angle of the radius, and being short worked well.

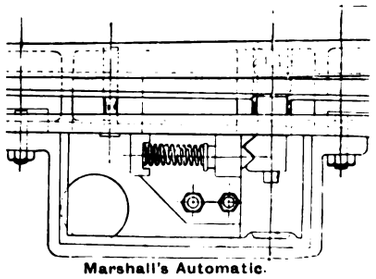
*Automatic Points.*—Marshall's was high above all others. Kenway had a movable point, with a spring inserted in the toe end, but this "jammed" frequently. Kenway also patented a swell point, which had the side of the R.H. tread swollen out to throw the cars to the left, and alternatively had a recess for a "jumper" to be inserted, but these were not successful. "Phillips' rocking jaw" point had a short life. "Chapman's" point had a brief life, and worked well, but was more expensive. The principle was a weighted lever—the tongue being depressed when the car ran over it—as against the Winby point, with a leaf-spring lever. A dispute as to patent rights took place between these two patentees, lasting over two years, and costing a good round sum of money. Askhams, as manufacturers, were the defendants. The first trial was won by the plaintiff. Then the appeal was given against them, with an order for a new trial at the County Palatine Court, Liverpool. Final result, a verdict for the manufacturers. Net result, no more points used of either kind. The present Justice Sir J. Fletcher Moulton was counsel for Askhams at the second trial, and many leading engineers of that day were subpœnaed on either side. Then further mechanical points were asked for, which produced several types—viz., Tadpole, Marshall, Allan and Robinson three-way, Allen and Warlow three-way, Hadfield three-way, which are now in use.

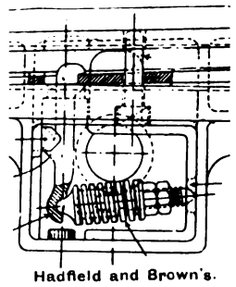
*Manganese Era.*—In 1901 manganese steel was introduced. Trial points were laid in High Street, Sheffield, but the first track to be constructed with manganese points was Salford, and for three or four years crucible cast steel and manganese steel were rivals in the field, but now manganese practically rules the market, either "Imperial" or "Era." Some tramway companies, however, still adhere to the cast steel, whether with inserts or without, but crucible cast steel had its limit in length and weight.

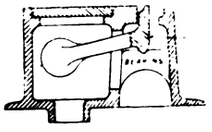


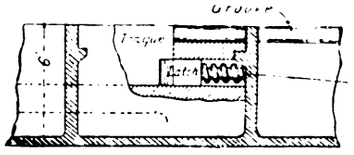
Marshall's Automatic Movable.

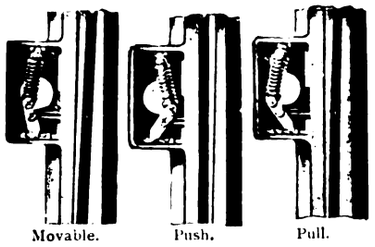

Marshall's Movable.


Marshall's Automatic.

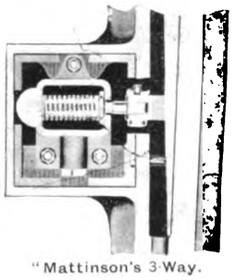

Hadfield and Brown's.

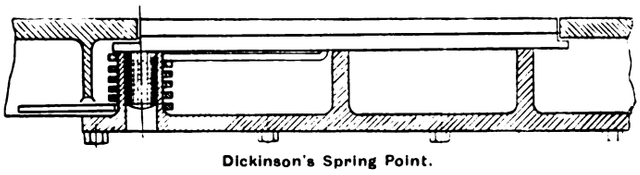

Phillips' Rocking Jaw.

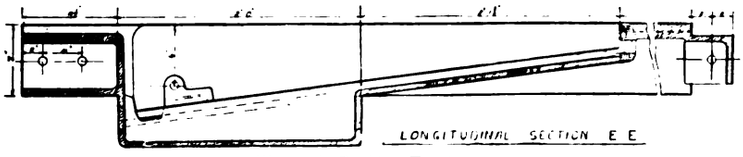

Kenway's Movable.



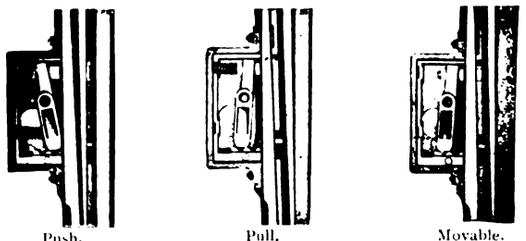
The "Hecla" 3-Way.


"Mattinson's 3-Way.

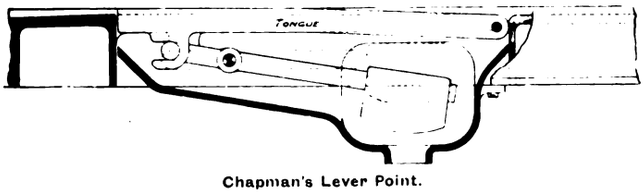

Dickinson's Spring Point.



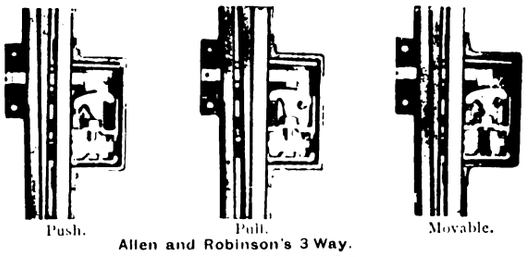
Kincaid's Rocking Tongue.



Allen and Warlow's 3-Way.



Chapman's Lever Point.



Allen and Robinson's 3-Way.

Mechanical Points before 1890.

Mechanical Points after 1890.

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*Modern Track.*—At present there are in use four types of points—solid manganese steel, solid cast steel, cast steel with manganese steel inserts, and built-up points of the continuous type, and five types of crossings—solid manganese steel, solid cast steel, cast steel with manganese inserts, iron-bound with manganese inserts, and built-up crossings.

The chief angles of crossings are:

| For Loops. | Frog Type. | Leg Type. |
|---|---|---|
| 1 in 5 | 4 ft. 0 in. long | 7 ft. and 8 ft. 1 in. long. |
| 1 in 5½ | 4 ft. 0 in. „ | 8 ft. long. |
| 1 in 6 | 4 ft. 6 in. „ | 8 ft. 6 in. and 7 ft. 2 in. long. |
| 1 in 6½ | 4 ft. 9 in. „ | 8 ft. 6 in. long. |
| 1 in 7 | 4 ft. 9 in. „ | 9 ft. long. |
| 1 in 8 | 5 ft. 0 in. „ | 10 ft. 6 in. long. |

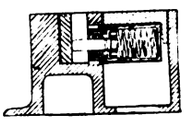
For Crossovers.
1 in 4½, 1 in 5, and 1 in 6.

For Interlacing Track.

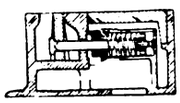
| | | |
|---|---|---|
| 1 in 6 | 4 ft. 6 in. long | 8 ft. 6 in. long. |
| 1 in 8 | 5 ft. 0 in. „ | 10 ft. 6 in. „ |
| 1 in 9 | 6 ft. 0 in. „ | 11 ft. long. |
| 1 in 10 | 6 ft. 9 in. „ | 12 ft. „ |

Points now are: (*a*) Automatic, with open mates; (*b*) double automatic, working independently; (*c*) double movables, with centre box and connections. The usual length is 12 ft., curved right and left to suit side loops, or curved equally to suit diamond loops, the chief radii being:

| | | |
|---|---|---|
| 75 ft. | Lateral by | 10 ft. long. |
| 100 ft. | „ | 12 ft. „ |
| 150 ft. | „ | 12 ft. „ |
| 200 ft. | „ | 13 ft. 6 in. long. |
| 300 ft. | „ | 15 ft. long. |
| 200 ft. | Equilateral by | 12 ft. long. |
| 240 ft. | „ | 11 ft. 2 in. long. |
| 350 ft. | „ | 15 ft. long. |

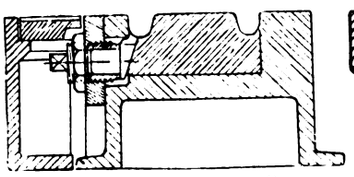


Askham's Push.

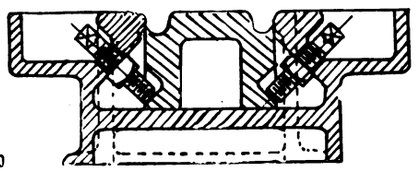


Hadfield's Full.

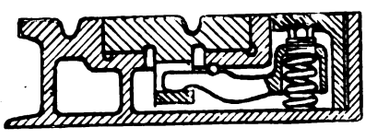
McKnight's "Silent" Controller.



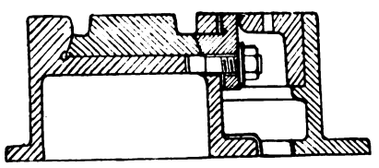
McKnight's (Improved).



"Allen and Larmuth."

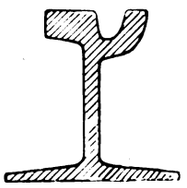


The "Tadpole."

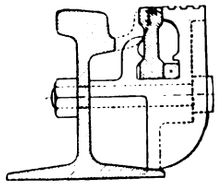


The "Hecla."

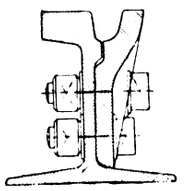
"Pinless" Type of Points.



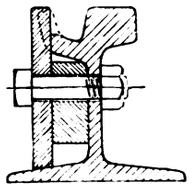
Solid Manganese Rail.



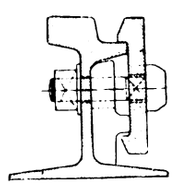
Holt's Guard.



"Bulfin Lip."



Flat Guard.



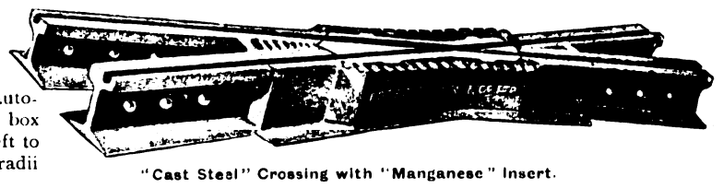
"L.C.C."

Curved Track.—Present Day.

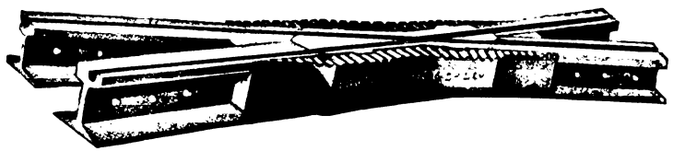
Some tramways still use 10-ft. and 12-ft. straight points, and where the leads are suitable, these give good results. The question of standardising the radii, angles and lengths is now being considered by the Engineering Standards Committee.

*The Points.*—These are fitted with manganese steel or forged steel tongues, at the option of the engineer, the latter type being the most convenient when renewing tongues in old points. These were, and still are, fastened down with a cross bolt at the toe and a pin at the heel, which, if properly fast, is the best principle for a working tongue. At first the pin was riveted through the tongue, the head in time being worn away, and consequently becoming loose; the other method being to "run" the pin in a recess underneath the tongue with spelter, or preferably cast iron, and is the method we adopt, having put down special appliances for dealing with same. A demand, however, has been made for a pinless tongue, and there are now three or more types on the market, more or less an extended principle of the "McKnight" heel adjuster, used upon short points years ago. There are the "Allen," the "Era" or "Hecla," and the "Tadpole" types, all of which are good.

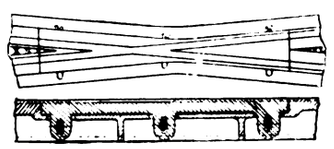
"Miller's" Chilled Iron with Fish Plates Cast in.



"Cast Steel" Crossing with "Manganese" Insert.



"Manganese" Leg Crossing.



Crossing with Renewal Piece (Kenway's).

Cast Steel "Frog" Crossing.

Types of Crossings.

*Terms "Right and Left Hand."*—If the observer stands at the toe end of the points the running tread is on either the right or the left hand, independent of whether points are straight or curved, but foreign terms "left and right" always mean curved to right or left, and mean a pair in all cases. "Open," "neutral," "dummy," or "mate," are terms for the point working with a movable, irrespective of curve or hand. "Dummy," however, was the term for the R.H. point, which had a high groove as against the open with two grooves. Grooves are now generally raised in both the mate and the crossings, usually to ½ in. deep. In diamonds, or curved junctions, or level crossings, the groove should be raised throughout, and should end "square" to obtain the best working results. Laying is an important adjunct to successful working, and the L.H. groove should always be straight or in a line with the running rails at loop ends.

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*Mechanical Controlled Points.*—It is astonishing how this idea has cropped up during the past 25 years. Nearly 100 different patents have been taken out for a point to be worked mechanically from the tramcar, but there was a perfect wave of mechanical points about 1900, when Glasgow invited inventors to submit their designs for this type of point, and we were simply inundated at that time by "all sorts and conditions of men." Many were ingenious, few were worth experimenting with, but a fair sum of money was spent in experiments, with no practical results. A mechanical controlled point is absolutely out of date, being superseded by the electric point controllers. The first adopted was the "Turner," now well known throughout the country. "Parr's" point was also tried, then came the Tierney-Malone point, as now installed in Dublin and Belfast, the Collins, the Stoffel, and the Dodwell.

*Silencers, or Silent Points.*—In 1901 Mr. McKnight, a Liverpool merchant, had the idea of producing a silent point, and spent a considerable sum of money in experimenting, the result being what is now known as the "McKnight silencer." This was adapted for both "push" and "pull" points, to suit the requirements of the two-point manufacturers, and a good sale took place. A little later, according to market terms, "silencers were quiet," and the demand has been intermittent since. The idea was to reduce the noise at passing places where a spring point was constantly working, and there is no doubt that the comfort is worth the extra expense.

*Curves.*—Originally upon sharp curves a high lip was used on the outside from $\frac{3}{16}$ in. to $\frac{3}{4}$ in. high, either as part of the rolled rail, or riveted on the side. The Board of Trade later on objected to these, and many were taken out, but some still remain. Then as sharp curves rapidly wore out, the best method of dealing with same became an important question. There are now several types, but without doubt the best are—(1) a solid cast manganese rail curved to radius; (2) a rolled manganese guard bolted on, either as a flat bar, or preferably a "section bar," known as the "Holt guard," fastened with chairs and bolts, which I think gives the best results; (3) a cast guard, known as "Bulfin lip," bolted on to the rail, which has given good results; (4) the London County Council section of guard, which can also be rolled in manganese steel.

*Loops and Turn-outs.*—These were also different to the present systems. Where possible the loops were laid with a perfectly straight run in at each end, and always with straight points and crossings, and this loop is still the easiest to work. Now the loops are either diamond or lateral loops, and with curved points.

*Cross-overs.*—These were frequently laid both right hand and left hand. The Dublin Southern was laid right and left alternately at very short distances. *En passant*, this line, I think, is the only one that runs express cars morning and night with three stops in nine miles, the earlier cars being shunted to let the express pass. At first for cross-overs the movable was the right-hand point, either automatic or a movable, but we substituted the left-hand movable point instead, thus ensuring an easier run through, which is now the standard practice.

*Junctions.*—A very great improvement has been made in the laying of special work. Everything is now set out, and curves spiralised, and principally built up at the works, so that everything can be tested before laying, whereas previously the jobs were laid on the ground, to the best ideas of the local engineer, and oftentimes the ganger was the chief authority, and many junctions have I seen fixed in this manner. Loops also were often laid in the same way, and when the crossings were scarfed from the rails the ganger fixed the position, and the rails were cut to suit. I remember upon one important line 26 different patterns had to be made for renewals, where certainly six would have done. In those days all tracks were laid by contractors, and one had to deal both with the contractor, his engineer and resident engineer, who if they did not work together, made matters very uncomfortable.

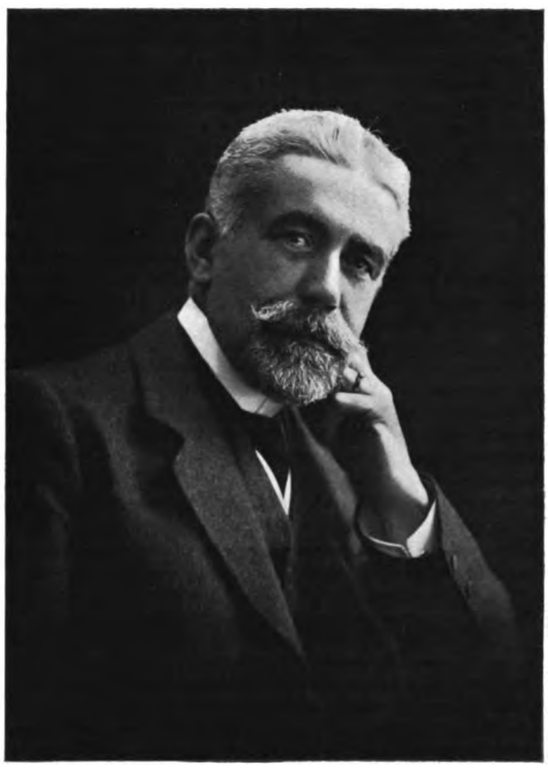
*Light Railways.*—The first tracks to be laid on sleepers on the road-side were at Kinver and Kidderminster. The points for the latter have just been renewed.

*Level Crossings.*—A great feature during the past few years has been the growth of cast level crossings for tramways crossing railway tracks. Until recently it was almost impossible to persuade railway engineers to cut their rails, even for street crossings. The North Eastern Railway, however, permitted this in Middlesbrough on a goods line in 1897; but at Hull, where passenger trains ran over, it was not successful, and only recently have they reopened this matter because of the unbreakable quality of manganese steel. The Great Central Railway, however, hold the premier position, as at Grimsby there were two level crossings laid in 1901, and the whole of the dock traffic, which is very heavy, has passed over continuously.

*Tramway Association.*—The first meeting of the original Tramway Institute of which there is a permanent record was at Bradford in 1892. At that meeting a reduction in rate assessment was asked for, and this question has been continually open. Our esteemed friend, Mr. Fearnley, the president of the Municipal Association, was then present, also Mr. T. B. Goodyear, now at Croydon; Mr. Mozley, of Burnley; Mr. Vaux, who was then one of the Bradford managers: and Mr. Courtenay, of THE TRAMWAY AND RAILWAY WORLD, and these gentlemen, with myself, were, at the time of writing this paper, the sole representatives at the present day out of 75 then present. In conclusion, I trust that, however meagre my paper may have been, it has contained something of interest to all of you.

## THE DISCUSSION.

Mr. FRED. BLAND, in introducing his paper, said he was pleased to have been able to place before them the paper as printed, and he would content himself with speaking to them on a few special points that he would like them, as tramwaymen, to consider. The printed paper, he remarked, could have been made much longer, but he preferred brevity to weariness. He had been told that there was very little contentious matter in it, but, as a manufacturer, it was difficult to give such a paper, and avoid advertising. Some of them, he thought, could "pick holes" if required. Referring to a large chart, showing the various types of sections of rails from 1883 to 1913, with a special section devoted to British standard rails, Mr. Bland said he would first of all ask them, "Why have so many rail sections?" Why should they not have two, or, at the outside, three sections, say, 6 in., 6½ in., and 7 in., and let them adopt these generally. By so doing they would simplify matters for manufacturers, with the result that there would be cheaper production and improved deliveries, as the



**Mr. Fred Bland.**

manufacturers could stock with safety. In this connection he would select No. 4, 7 in. rails, as being the best standard at present. Another suggestion was the adoption of standard radii points in their renewals, taking a 150 ft. radius as the standard. Experience showed this to be the radius that replaced the old loops most economically. Then they could have a radius of 100 ft., and another of 200 ft., for special work; and either a 200 ft. or 240 ft. equilateral for diamond loops would meet a lot of difficulties that tramway managers had to contend with. Also they should adopt standard types of points—automatic and open makes on country roads, and double-tongue points in towns, where the points were constantly cleaned, and upon all facing points. With regard to the question as to whether or not the tongue should be fitted with a heel pin or be pinless, he personally preferred a pin with a heel adjuster. Let them also raise all grooves of open points or crossings on turn-outs, etc., to ½ in. deep; but in double junctions where cast connected crossings were used, as at present, he suggested carrying the raised groove throughout, and, if they would pay more, then carry the grooves out square across the track, thereby ensuring easier running. He also advocated a rail with a groove rolled in it for curves; and this, by the way, had never been considered in this country—why, he did not know. There was also the question of what type of renewal guard was most suitable for sharp curves. Further, he would suggest that on emergency cross-overs, other than terminals, they should

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abolish the old crossings, and put in unbroken tread crossings, or use a long rail and bolt on wing crossings for the cross-over track, for by so doing they would reduce their repairs and get easier running. All these were matters, he concluded, that were worthy of their consideration as tramway men, and he would be very pleased indeed if some of them would take them up. (Applause.)

The CHAIRMAN here said that they had amongst them one of their original members, Mr. H. M. Sayers, and they were glad to welcome him back, and he would ask him to speak. (Applause.)

Mr. H. M. SAYERS (resident engineer, City of Santos Improvements Company), whose rising was greeted with applause, said the main thing on which improvement was required was the special work of points and crossings, but more particularly of crossings. It was very curious that during the last three years he had had to use points and crossings made by two English manufacturers, and "Vignoles" rails by an American manufacturer, and he had had to send all the crossings into the machine shops before they could be put into the track. The reason was, the raising of the groove was insufficient, and it suffered from the wheel flanges catching the point of the diamond. He also had to complain of the angles of the crossings, and also about the points of the diamonds, and this had happened although the manufacturers knew very well the gauge of the track, the wheel base length, as well as the radii of the curves. However, he must say that manufacturers succeeded very well as a general rule in constructing special work in the way of curves, crossings, and junctions, where they were given the full elements of the radii, points, etc. He had had to put in, during the last three years, 96 crossings and junctions of various sorts, all of which were constructed in England from drawings sent out from Brazil. He thought that it was very creditable to the manufacturers here that there were very few cases of adjustment being required when they came to put them together. That showed the extraordinary care they took both in designing and the final lay-out. With regard to points, he thought there was hardly enough care taken in regard to the tongues. There were a good many places where tongues became bent or worn, and so became unworkable. They were then, of course, immediately changed, but this meant that traffic had to be suspended, and all work had to be done at night. With regard to rail sections, he was very well satisfied with the grooved rails of British standards—the only thing he would say was that all the heads should be similar in width. At the present time the heads were of different widths; and he thought this was a mistake. Alluding, in conclusion, to the chart showing the great number of rail sections, he thought it represented an enormous waste of energy. It was very interesting historically and from a museum point of view, but he sincerely hoped that these sections would be cut down to about half-a-dozen approved types of rails. (Applause.)

Mr. A. R. BLACKMAN (chief engineer, Belfast Corporation Tramways) said that in consequence of adopting Tierney's automatic point shifters they had been able to do away with point boys in the streets.

Mr. H. E. Blain (manager of West Ham Corporation Tramways) was then called upon by the Chairman, who said that probably they were all aware that Mr. Blain had resigned his position at West Ham, but he hoped that the Association would not lose the benefit of his services.

Mr. BLAIN said they would no doubt have observed that the screen behind the Chairman's back had been upheld for a very significant reason, for if it had been dropped no doubt they would have seen on it the words "England expects every man to do his duty." That was probably the reason why Mr. England had called upon "all sorts and conditions" of them to make all kinds of unexpected remarks. (Laughter.) He (the speaker) felt that he was neither "fowl, flesh, nor good red herring" at that moment—(laughter)—but he was exceedingly obliged to the members and officers of that Association for their courtesy in extending to him the invitation to be present. And he must compliment them on the excellent arrangements made. He must say that he had been connected with many other organisations, but in Mr. A. de Turckheim they had a secretary *par excellence*. (Hear, hear, and applause.) He had no special remark to make about the paper, although he did think it was of distinct value from an historical point of view. (Applause.)

Mr. W. B. PICKERING (of Sheffield) congratulated Mr. Bland on his paper, which had been very interesting, especially to the younger members of that Association. (Hear, hear.) Since the introduction of tramway traction, he said, manufacturers had come to the rescue of the tramway men: and they had provided them with a better type of point and crossing than existed in the early days. But that did not say they had reached finality. Mention had been made of the length of tongues—well, that was a matter not in the hands of manufacturers, but for which tramway engineers were largely responsible. Manufacturers to-day were turning out tongues from the same pattern that were absolutely interchangeable. He asked the delegates to that Congress to consider seriously the advisability of not increasing the present number of sections. From the manufacturers' point of view it was exceedingly difficult to meet the demand made on them; and they would greatly help manufacturers by not increasing the number beyond a dozen.

Mr. E. H. EDWARDES (general manager, South Lancashire Tramways Company), referring to the diagrams on page 670 of the paper, showing comparisons in lengths of points, said that in 1882 the length was 7 ft. 6 in., and in 1912 it had got to 15 ft. Was that to go on increasing? It might be an advantage to the manufacturer, of course. (Laughter.) Mr. Bland had also referred to "silencers," and recognised them. Well, he (the speaker) had tried them, but owing to some neighbours complaining about the noise they made, they had to be taken off. (Laughter.)

Mr. H. HEWER said that without going into the historic features of the subject, there was one point which required some comment, namely, the position to which the author would relegate "insert" construction. In Manchester, Glasgow, Newcastle, and many other towns in this country, this type was preferred, or at any rate accepted on an equality with solid manganese steel, because it was more economical, and gave better satisfaction in many respects. The author seemed to suggest the use of independent movable points. This, he thought, was bad practice, as any slight obstruction might interfere with the movement of one tongue, and so cause derailment. If two tongues were required, they should always be connected. He was surprised to note that good results were still claimed for the old straight points, as obviously it was against all codes to divert a car on a sudden tangent. Reference was also made to the use of manganese steel tongues. This metal was unsuitable for this purpose, unless the tongue was reinforced to give additional lateral strength and bearing. Manganese steel offered a high resistance to abrasion, but was non-resilient and ductile, consequently the usual thin tongue was liable to become bent by the pressure of the car wheels, and so threw a car off the track.

Alderman H LINSLEY (chairman of Salford Corporation Tramways Committee), who was present as a representative of the Municipal Tramways Association, was then welcomed by the President, and said that he was there as a listener, not an expert, and he was glad of the opportunity to hear their debates.

Mr. C. FURNESS (electrical engineer and tramways manager for Blackpool Corporation), on rising, responded to the Chairman's call, and was warmly received. Like Alderman Linsley, he said, he was a listener. But speaking on the paper, he said he had one strong objection to the present methods of track laying. It was not so much in regard to points and crossings, but in the foundation. He had come to the conclusion that more than 70 per cent. of the troubles experienced by tramway managers was due to bad foundations of the track. He advocated a "cushion" foundation by placing timber between the rails and the concrete, and in proof thereof he said they in Blackpool had a length of track in Station Road, South Shore, where delegates interested would have the opportunity of judging of the silent running of the cars. He was watching this section closely. It had been laid down for two and a half years, and there had been no movement of the rails. The track was laid down on timber 9 in. by 5 in. It was a very good job, and he should like to see the whole of their track on the Promenade laid like it. The delegates, he added, would realise on the morrow, when they travelled on the Blackpool and Fleetwood tramroad, the nice "cushion" effect. From the moment they left the Blackpool boundary they would hear nothing of the hard grating noise of a concrete foundation.

Mr. R. HUMPHRIES (chief engineer, Birmingham and Midland Tramways Joint Committee), speaking as one who had some 60 miles of tramways to look after, said their chief trouble as to track had been with the concrete bed. He quite agreed with Mr. Furness in his remarks about sleepers. They had a great deal of track in the "Black Country," and in some cases they had lost concrete foundations laid years ago. Where it had gone to he did not know—unless the miners had excavated it and were disposing of it as coal, which might be the case judging by the quality of the coal they got. (Laughter.) Now they were running on a sleeper construction for miles, and the track gave far less trouble, and the cars ran far more quietly and cheaper than where concrete was used. They had scrapped their chilled wheels, he went on to say, and had equipped all their cars with tyred wheels, and they had been running much more smoothly round their curves ever since.

Mr. T. C. TEGETMEIER, chairman of the Auckland Tramways Company, corroborated what had been said about foundation of tracks. Their track in Auckland was originally constructed upon longitudinal concrete sleepers Now, the concrete was broken up, and the sleepers were laid without concrete upon the broken up mass of concrete previously existing. It formed an ideal track, and the result was that the running of cars was much more easy, and the cost of repairs very much less.

Mr. A. W. A. CHIVERS, as the permanent way engineer of the British Electrical Federation, who had some 450 miles of track to keep under repair, emphasised the point that conditions varied in different parts of the country. A system of track construction might suit one district but not another. Take Greenock, for instance. There they had traffic in boilers, 60 or 70 tons weight; and these were very destructive to the permanent way.

The Congress then adjourned until the following morning.

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## FRIDAY'S PROCEEDINGS.

The Hon. ARTHUR STANLEY presided over the Conference proceedings on the second day, and expressed his thanks to Mr. England for having taken the chair during his absence on Thursday, and called upon him to introduce the following paper:

# RAILLESS TRACTION LEGISLATION

AND

DIGESTS AND ANALYSIS OF THE PRIVATE ACTS WHICH HAVE BEEN PASSED BY PARLIAMENT AUTHORISING THE CONSTRUCTION AND WORKING OF RAILLESS UNDERTAKINGS AND TROLLEY 'BUSES.

BY HARRY ENGLAND

*(General Manager, Yorkshire (West Riding) Electric Tramways Company, Limited).*

I intended to expend my energies in compiling a digest and analysis of the various railless traction Acts which have been presented to Parliament by Corporations and companies, and which have received Parliamentary sanction. I further proposed to make some brief comments bearing upon the mutilated Light Railway Bill of last year, which included some provisions ostensibly framed to cheapen and facilitate the promotion of railless schemes. The scope of the paper gradually widened, and I received requests to include some details of the running costs of trolley cars if possible, and also to describe the various systems of overhead line and cars now offered by contractors in this country. By the kindness of my friends, Messrs. Hamilton, Spencer, and Cross, I have been able to obtain, and now publish, the costs of operating trolley cars in Leeds, Bradford, and Rotherham, and, as regards the description of systems, I have briefly touched upon the salient features of each. I trust those present will accept this explanation and apology.

### RAILLESS TRACTION LEGISLATION.

This paper will be incomplete without some reference to the Government's Light Railway Act of last year, because, as most of you remember, the Government proposed to include clauses by which a trackless trolley system might be authorised by Order under the principal Act in the same manner and subject to the same conditions as a light railway. The first clause of the bill was the most important to us as promoters of railless schemes, because the Board of Trade always have been prohibited from confirming an Order made by the Light Railway Commissioners if the scheme was of great magnitude or competitive with an existing railway. The bill proposed to empower the Board of Trade to promote a bill for confirmation of their Order, and I think we may assume that a bill promoted by a Government department would receive the favourable consideration of Parliament, and that portion of the proceedings would be less costly than a private bill.

The Standing Committee mutilated the railless portions of the bill to such an extent that it became impossible, and on strong representations being made by the Tramways Associations the Government deleted the railless clauses, and, as regards general legislation, we are as we were before the bill was promoted. We could not allow, without straining every nerve to prevent it, any clause appearing in a bill of this character making it incumbent upon us to obtain the consent of every road authority concerned. The idea is preposterous, because any petty authority exercising control over a few yards of road would be in a position to exact onerous and unjust terms, or even to veto the scheme, and our condition would be infinitely worse than it is to-day.

The Standing Committee also amended the bill by inserting a clause making the owners of trolley cars responsible for road maintenance. I propose to deal with this question when criticising the road maintenance clauses of the various private Acts. My point in introducing the defunct railless clauses of the Light Railways Act in this paper is to interest you in the crying need there is for legislation that will cheapen and accelerate applications for powers to run trolley cars.

It is a sad commentary, and does not redound to the credit of our common sense as a nation, that to enable us to do works and run trolley cars we should have to go through so many time-wasting formalities and to expend so much of our capital uselessly. Under the present law a scheme promoted in the autumn of one year may receive the Royal Assent in the month of July following, and only then after the expenditure of many, many hundreds, nay thousands of pounds sterling that might have been usefully employed in building the line. In a small trolley car scheme the costs of the Act and incidentals would form a major part of the capital employed, and surely some means can be devised to overcome this drag upon enterprise! No wonder companies shirk this procedure and expense and fly to motor 'buses as the alternative which offers immediate results and no outlay on legislative idiosyncrasies!

Well, gentlemen, to some extent the remedy is in the hands of the two Tramway Associations, and so long as we are content to keep our grumbling within our own ranks, and we do not make our voices heard and our wants known, so long shall we suffer the disabilities of unnecessary, costly, and tedious formalities.

### DIGESTS OF PRIVATE ACTS.

In the following digests of private Acts I have attempted to give as briefly as possible the clauses which are interesting to members of the Association who may be contemplating railless traction, and I hope these will be of some service, not only to us to-day, but for reference afterwards, and, with your permission, I will now deal as briefly as possible with the provisions of the various Acts. Eighteen private Acts in all have received the sanction of Parliament, and of these 15 have been obtained by local authorities, and three by companies.

*Time Allowed by Acts for Completion of Works.*—The minimum time allowed for completion of works authorised by any of the various Acts is two years from the passing of the Act, and the maximum is five years. In some cases it will be seen from the table that no time is stated in the Act, whilst in the case of Rotherham the powers granted cease at the expiration of a certain period if the works are not constructed or to so much thereof as the Board of Trade may approve. If it is necessary for any period to be stated in the Act, I think the Rotherham provision is a very wise one, because unforeseen difficulties may occur which would unduly prolong the period of construction, and the Board of Trade should be empowed to grant an extension of time.

*Vehicles.*—What may be regarded as a model clause is incorporated in almost all of the Acts, viz., that the form, construction, and dimensions of trolley vehicles shall be subject to the approval of the Board of Trade. Some of the Acts specify the maximum weight of vehicles loaded, and others the minimum width of tyres and diameter of wheels. I am of opinion that these two points are well covered by the general provision, and I think any arbitrary stipulations as to weight, tyres, and wheels should be avoided.

*Carriage of Parcels, Goods, Animals, and Minerals.*—By reference to the analysis of the various private Acts you will see that only the Brighton and Stockport Corporations have powers to transport goods and merchandise. Leeds, Halifax, and Ramsbottom have restricted powers, whilst in other cases parcels not exceeding 56 lb. in weight may be carried. It does seem strange that enterprise should be hampered in this manner, because, as a general thing, railless systems will penetrate into districts almost void of transport facilities, and the power to convey the village tradesmen's supplies, and to use the vehicles to the fullest advantage, may make all the difference between a paying and a non-paying proposition.

I have a case in mind where a railless line is contemplated to a village 4½ miles from any railway station, and where it would be possible for a good remunerative goods traffic to be handled. The goods are of a light nature, and the weight of the vehicle loaded need certainly not exceed five tons. There is sufficient volume of this traffic to justify the running of suitable vehicles, yet I am afraid, Parliament, following the general precedents, would not sanction these powers.

Railless traction provides such a cheap and convenient means of making connections to manufacturing premises and to railway goods yards that the objections some of us have been fighting for years seem likely to be overcome. On interurban lines, particularly where passenger traffic is so light that full attention can be given to the development of goods traffic, we have striven to create such a traffic, but have failed simply because merchants and manufacturers were not willing either to pay the cost of putting in junctions to their premises or to enter into any minimum tonnage agreement over a term of years. The cost of running a railless trolley circuit a matter of 50 or 100 yards is a very different proposition, and there would appear to be some hope of building up a business with satisfaction and gain to manufacturers and the operating company.

The old bogey "competition" is responsible for these irritating restrictions, and our friends the railway companies will wake up too late to recognise that they have driven away traffic they will never regain. The cry to-day is for speed and for immediate delivery of goods, and manufacturers are fast finding out that motor vehicles are quicker than the railway goods service, and daily we see more and more motor vehicles on the roads engaged in transporting goods and materials direct from manufacturer to manufacturer or to merchant. The delay in delivery occurs between the railway goods yards and manufacturers' premises, and if the railway companies would eliminate the jealousy which appears to be responsible for their policy at present, and give facilities to companies and corporations to deal with goods between the goods yards and the mills, it is probable that the railways would keep the traffic they have, and perhaps regain some of that they have already lost.

*Use of Trolley Vehicles for Sanitary Purposes.*—The local authorities of Bradford, Aberdare, Hove, Ramsbottom, and Chesterfield are authorised to use trolley vehicles for the conveyance of sanitary refuse, road metals, and materials required for the works of the authority, and in the case of Chesterfield it is provided that the weight of the vehicles loaded

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shall not exceed five tons. I am not sure that this will be of any great benefit to the authorities concerned, and if powers to convey goods and minerals were included in all Acts, this provision would not be necessary.

*Fares.*—There is nothing of interest to this Congress regarding ordinary fares and cheap fares for working classes, and as Dundee is quite exceptional, the only company that is not bound to run a service of workmen's cars or to charge workmen's fares is the Brighton Company.

*New Routes.*—It seems to be usual for the Board of Trade to take powers to make Provisional Orders authorising the use of trolley vehicles upon any other routes within the local authorities' area when once railless powers have been obtained, but this statement does not, of course, apply to the three companies that have obtained Parliamentary sanction. No provision for extension has been made in the cases of the Brighton Company and the Rhondda Company, but the Board of Trade may authorise the use of trolley vehicles upon other routes in the Ormesby Company's area with the consent of the County Council, and in the case of Halifax Corporation the Board of Trade may authorise other routes outside the area of the Corporation with the consent of the district local authority and the road authority. This is a valuable concession, and should be incorporated in all future Acts.

*Conversion of Trolley System to Tramways.*—As railless cars will be operated in many cases from the termini of existing tramways to adjacent villages with a view to testing the traffic possibilities of the routes, it would seem reasonable that the owning authority should have the power to put down a tramway if the traffic was found to warrant the expenditure. This power has been obtained by the Ramsbottom Urban District Council, but I am informed that the Council had powers to construct tramways before applying for railless powers, so the concession to convert the trolley system into tramways by laying down rails, etc., is not quite what it seems. I suppose it would not be possible to obtain Parliamentary powers to convert a trolley system into tramways at the same time and in the same Act.

*Through Running and Interchange of Traffic.*—I see no reason why powers to enter into working agreements with adjacent owners for the purposes of through running and interchange of traffic should not be obtained, and it is strange that the Stockport Corporation is the only authority who may make any arrangements of this kind by virtue of their railless Act. The Corporations of Bradford and Chesterfield have powers under their Tramways Acts, which are incorporated in the railless Acts, but in all other cases no provision has been made, or restricted powers only have granted.

*Trailer Cars.*—Evidently the promoters of railless traction Acts are not contemplating the use of trailer cars, because in most cases no provision is made, and in the Acts of Rotherham and Chesterfield trailers are expressly prohibited. The Ormesby Company and the Rhondda Company may use trailers by first obtaining the consent of the Board of Trade, but Keighley must, in addition to this, obtain the consent of the County Council.

*Road Widenings.*—Various road widenings are stipulated, and the cost is apportioned between the road authorities and the operators. In most cases the road widenings appear to be reasonable, but the Rotherham Corporation is required to pay three-fourths of the cost, which is certainly not equitable or reasonable. Aberdare is called upon to pay half the cost of widenings; Keighley, Chesterfield and Rhondda one-third the cost; whilst the Sheffield Corporation appears to have to pay the whole of the cost, but is not required to purchase any land, and is not obliged to do any widening beyond throwing the roadside waste into the carriageway. The Ormesby Company is not required to pay any of the cost of road widenings, although it is stipulated that a certain route shall not be used until the widenings have been carried out by the County Council.

*Paving at Termini.*—This clause is peculiar to Rotherham, and whilst it may be desirable for the termini of railless routes to be paved, still I think the road authority should be willing to pay a substantial proportion of the cost.

*Improvement of Road Surfaces.*—In only two cases, those of Aberdare and Ramsbottom, is there any provision for the improvement of road surfaces. The Aberdare Council is required to pay half the cost of the necessary surfacing, and the Ramsbottom Council one-fourth of the cost of laying tar macadam on proper foundations on the trackless trolley routes.

*Road Maintenance.*—This is a point which will determine the popularity or otherwise of railless systems. We cannot admit for a moment that railless systems should be singled out from all other forms of road traffic for special road tax, and until all other forms of mechanical transport are by general legislation required to pay a reasonable portion of the cost of maintaining the roads, we strongly object to this burden being put upon railless traction.

The Rotherham Corporation led the way in this matter by agreeing with the County Council and the Rotherham Rural District Council to pay the sum of three-eighths of a penny per car-mile run, or a limited sum per annum, whichever might prove to be the greater, but the liability does not stop there, because if this payment proves inadequate to recoup the County Council for the extra expenses incurred by them, the Corporation is required to pay the additional sum. This additional sum is to be arrived at by agreement, or failing agreement by arbitration.

A similar clause is incorporated in the Acts of the Brighton Company and the Chesterfield Corporation, whilst Sheffield and Keighley are practically identical, and in both these cases the road authority may recover from the Corporations the cost of the extra expense incurred by reason of extraordinary traffic. The Ramsbottom clause is practically the same, except that the Ramsbottom Council will not pay the County Council, but will have the amount deducted from the road grant.

From the point of view of the investor in railless traction schemes the clause inserted in the bill of the Rhondda Company is the only practicable one out of the many inserted in railless traction Acts. In the Rhondda clause the liability is limited to three-eighths of a penny per car-mile, and this being the case estimates can be made with some certainty as to the cost of operating trolley cars, but where the liability is unascertained, and is quite indefinite, it would be quite hopeless to expect any investor to provide money for the construction of such systems, and if we are compelled to contribute to road maintenance before any general legislation is passed, the Rhondda clause is the only acceptable one.

*Railway Bridges and Approaches.*—The protective clauses obtained by the various railway companies seem to have extended in scope since the first few railless traction Acts were promoted. In the Halifax Act the words "use the trolley vehicles so as not to injuriously affect any bridge or bridge approach" were first inserted, and the same words have been incorporated in the Acts of the Hove and Brighton Corporations. No objections can be raised to the usual protective clause as to construction and user of works on railway bridges and approaches, but I think a strong stand should be made against the insertion of the words "use of trolley vehicles." Railway companies are required to erect and maintain bridges and bridge approaches to carry all road traffic, and I do not see that they are entitled to any special protection against the owners and operators of trolley vehicles.

*County and Main Road Bridges.*—The protective clauses of the County Council inserted in the Rotherham and Sheffield Acts are objectionable, because such clauses provide that any injury or damage caused to county or main road bridges by the operation of trolley vehicles must be made good at the cost of the operators. The same arguments apply to county bridges as to railway bridges, and it will quickly become the fashion to attribute all damage to bridges however caused to trolley vehicles, and the fact that motor traffic of all descriptions is growing by leaps and bounds and using the bridges, will be entirely ignored.

*Gas Companies' Protective Clauses.*—These clauses come from the South, and we can well do without them. I imagine it would be extremely difficult for the gas companies to prove that damage to their mains and apparatus had been caused by reason of the running of trolley vehicles, but I think the clauses as they stand are unreasonable and unfair, because no account is taken of other road traffic which, by reason of weight and speed, is calculated to do far more damage than trolley vehicles can possibly do. The Ormesby clause is also objectionable, and the gas company has even gone further in this instance, and is entitled to recover damages for interference with the supply of gas.

*Damage to Drains.*—A clause making the company liable for damage to drains and sewers by reason of the running of trolley vehicles is peculiar to Ormesby, and I hope and trust that this will not spread to other railless traction Acts. The same arguments apply in all these cases, that the railless traction company is not the only user, and their vehicles are not so severe on the roads as other forms of traction, and certainly liability which does not extend to other vehicles should not apply to trolley cars.

*Removal of Snow.*—This clause, which is inserted in a good many Light Railway Orders and Tramway Acts, has been incorporated in the Railless Traction Acts of Halifax Corporation, Ormesby and Rhondda Companies, and the Brighton Corporation. It is honoured more in the breach than the observance, and throws responsibility upon operators that should be borne by the local authorities. Like tramways and light railways, railless traction schemes will be rateable and therefore contribute to the cleansing and scavenging of roads. Only when the local authorities lamentably fail in the execution of their ordinary duties is it necessary for the traction companies to step in and remove snow so that they may continue their business, but to require the traction company to perform something which is obviously the duty of the local authority—in addition to clearing the path for its own vehicles and for other road users—is putting something upon them that ought not to be borne without strong remonstrance. A clause of this description is inserted in one Act, and quickly is regarded as a model clause to be inserted in all simply because vigorous objection is not made. I hope that all promoters of railless schemes will, in future, see that this clause is not embodied in their bill.

*Advertisements on Cars and Poles.*—The question of advertising on cars and poles is not a very important one, and it appears to be the general practice in railless Acts to allow advertisements on cars, but not on poles or the electrical equipment.

*Competition.*—No attempt has been made in any of the railless traction Acts to prevent competition, except in the case of the

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Brighton Corporation, where the local omnibus company is prohibited plying for hire in any street in which trolley vehicles are run, whilst the railway companies have obtained a protective clause in the Keighley Act which prevents the Keighley Corporation entering into any running powers agreement with neighbouring authorities so that they may run their cars in competition with the railways. I think the Brighton example might be followed with advantage and extended to all routes on which trolley cars are installed and a satisfactory service given.

*Purchase Clause.*—In the Keighley Act the neighbouring authorities are empowered to purchase that portion of the railless system in their districts at the end of 21 years, and in the Chesterfield Act, section 43 of the Tramways Act, 1870, respecting purchase of undertaking by local authorities, is incorporated.

*Accounts.*—As stated in the analysis of the various Acts, all local authorities are required to keep the accounts of railless schemes quite separate from either tramway accounts or other accounts of the authorities, and where payment has to be made for road maintenance on a car-mileage basis, proper mileage statements of trolley vehicles must be kept.

*Periods Allowed for Repayment of Borrowed Moneys.*—The table at the end of the analysis shows the periods allowed by the various Acts for the repayment of loans, and I do not think any criticism of these figures is necessary.

The author next set out in full the following railless trolley Acts of Parliament: Dundee (1907), Leeds (1910), and Bradford (1910) Corporations; Chiswick Urban Council (1911); Rotherham (1911), Halifax (1911), Northampton (1911) Corporations; Aberdare Urban Council (1911), Brighton, Hove, and District (1911) (Brighton, Hove, and Preston United Omnibus Company); Hove (1912), Brighton (1912), Sheffield (1912), Keighley (1912) Corporations; North Ormesby, South Bank, Normanby, and Grangetown (1912); Stockport Corporation (1912); Ramsbottom Urban Council (1912); Chesterfield Corporation (1913); Rhondda Tramways (Railless Traction) (1913).

## ANALYSIS OF THE PRIVATE ACTS.

### ROUTE MILEAGE, PROGRESS OF WORKS, NUMBER AND DESCRIPTION OF CARS IN USE.

DUNDEE.—Route 1¼ miles. Opened for traffic September 4, 1912. Two single-deck cars seating 28 passengers.

LEEDS.—Route 4¼ miles. Opened for traffic June 20, 1911. Four single-deck cars seating 28 passengers.

BRADFORD.—Route 1¼ miles. Opened for traffic June 20, 1911. Two single-deck cars seating 28 passengers.

CHISWICK.—Authorised route 2¼ miles. Not constructed.

ROTHERHAM.—Authorised route 9 miles 3 furlongs 0·05 chains. Constructed 4 miles 6 furlongs. Opened for traffic October 3, 1912. Three single-deck cars seating 28 passengers.

HALIFAX.—Not constructed. Authorised route 7 furlongs.

NORTHAMPTON.—Authorised route approximately 1½ miles. Not constructed.

ABERDARE.—Authorised route 3 miles 4 furlongs 2·9 chains. Not constructed.

BRIGHTON COMPANY. Authorised route 2½ miles. Not constructed.

HOVE.—Authorised routes 8 miles 2 furlongs 9·33 chains. Not constructed. Thirty trolley vehicles provided in Act.

BRIGHTON CORPORATION.—Authorised routes 6 miles 5 furlongs 7·40 chains. Not constructed.

SHEFFIELD.—Authorised routes 8 miles 1 furlong 6·70 chains. Not constructed.

ORMESBY.—Authorised routes 5 miles 5 furlongs 1·6 chains. Not constructed.

STOCKPORT.—Authorised routes 1 mile 6 furlongs 0 chains. All within the borough. Constructed 1 mile 6 furlongs 0 chains. Opened for traffic March 10, 1913. Three single-deck cars seating 28 passengers.

RAMSBOTTOM.—Authorised routes 3 miles 3 furlongs 6 5 chains. All within the district. Partially constructed, 2 miles. Six single-deck cars seating 28 passengers. Opening fixed for May 31, 1913, but since postponed.

CHESTERFIELD.—Authorised routes 16 miles 4 furlongs 0 chains. Not constructed.

RHONDDA.—Authorised routes 4 miles 6 furlongs 2·7 chains. Not constructed.

### TIME ALLOWED BY ACTS FOR COMPLETION OF WORKS.

ROTHERHAM.—Two years from January 1, 1912, as regards routes 2 and 3. The Board of Trade have power to decide.

ABERDARE.—Within five years.

BRIGHTON COMPANY.—Within two years of the passing of the Act.

HOVE.—Two years for through routes, and five years from passing of Act for the remainder.

BRIGHTON CORPORATION.—As regards the Brighton through routes within two years. System to be agreed between Brighton and Hove. Remainder within five years from the passing of Act.

KEIGHLEY.—No time stated as regards works in borough. Four years in the districts of Oakworth, Haworth, Oxenhope, and the rural districts of Keighley and Skipton.

ORMESBY.—Four years from passing of Act.

STOCKPORT.—Five years from the passing of Act.

RAMSBOTTOM.—Five years from the passing of the Act.

No time stated in the other Acts.

### FORM, CONSTRUCTION, AND DIMENSIONS OF VEHICLES.

There is a common clause in almost all of the Acts that the form, construction, and dimensions of trolley vehicles shall be as the Board of Trade may approve. The same condition also applies to the electrical equipment. In some cases the maximum weight of loaded vehicles is stipulated, so I have prepared the following table:

LEEDS.—Not to exceed 5 tons loaded.

BRADFORD.—Not to exceed 5 tons loaded.

CHISWICK.—To the approval of the Board of Trade.

ROTHERHAM.—Not to exceed 5 tons loaded.

HALIFAX.—Not to exceed 5 tons loaded.

NORTHAMPTON.—Not to exceed 5 tons loaded.

ABERDARE.—Not to exceed 5 tons loaded.

BRIGHTON COMPANY.—Not to exceed 5 tons, or 7 tons 18 cwts. loaded.

HOVE.—To the approval of the Board of Trade.

BRIGHTON CORPORATION.—To the approval of the Board of Trade.

SHEFFIELD.—To the approval of the Board of Trade.

KEIGHLEY.—Not to exceed 5 tons loaded.

ORMESBY.—To the approval of the Board of Trade.

STOCKPORT.—To the approval of the Board of Trade.

RAMSBOTTOM.—Not to exceed 5 tons loaded.

CHESTERFIELD.—To the approval of the Board of Trade.

RHONDDA.—To the approval of the Board of Trade.

### DIAMETER OF WHEELS AND WIDTH OF TYRES.

In some cases minimum dimensions are specified

ROTHERHAM.—The width of tyres on the back or driving wheels shall not be less than 6 inches, and the diameter of such wheels shall not be less than 2 ft. 6 in. The tyres to be of rubber or other substance to be agreed between the County Council and the Corporation.

BRIGHTON COMPANY.—Tyres on back wheels to be not less than 8 in. wide and 3 ft. in diameter. Tyres to be of rubber or some other substance approved by the County Council.

ORMESBY.—Width of tyres on back wheels to be not less than 6 in. and the diameter of wheels not less than 2 ft. 6 in. The tyres to be of rubber or some other substance as may be agreed between the County Council and the company.

RAMSBOTTOM.—Tyres on back wheels to be not less than 8 in. in width, and diameter of back wheels to be not less than 3 ft. Tyres to be of rubber or some other substance approved by the County Council. No provision in the other Acts.

### CARRIAGE OF PARCELS, GOODS, MINERALS, ANIMALS, ETC.

DUNDEE.—Same as on tramways.

LEEDS.—Parcels not exceeding 56 lb. in weight may be carried. Trolley vehicles not to be used for the conveyance of goods and minerals, except such traffic as arises in and is destined for places within the city.

BRADFORD.—The Corporation cannot carry minerals or merchandise except their own materials, stores, town's refuse, and manure, but may convey parcels not exceeding 56 lb. in weight.

CHISWICK.—Carriage of parcels up to 56 lb. in weight only permitted.

ROTHERHAM.—Carriage of parcels, goods, and minerals prohibited with the exception of passengers' luggage and small parcels.

HALIFAX.—By section 39 of Act 1902 the Corporation may carry minerals and merchandise between any point on the system and the railway stations by agreement.

NORTHAMPTON.—Carriage of goods, animals, and minerals prohibited except passengers' luggage and small parcels.

ABERDARE.—Goods, etc., prohibited. Parcels not exceeding 56 lb. in weight may be carried.

BRIGHTON COMPANY.—Personal luggage of passengers not exceeding 28 lb. in weight only allowed.

HOVE.—No provision.

BRIGHTON CORPORATION.—By section 21 of the Act 1900 the Corporation may carry any goods, minerals, etc.

SHEFFIELD.—Passengers' luggage and small parcels only allowed.

KEIGHLEY.—Parcels up to 56 lb. in weight allowed.

ORMESBY.—Only parcels not exceeding 56 lb. in weight permitted.

STOCKPORT.—By section 22 of Act 1900 the Corporation may carry goods, minerals, etc.

RAMSBOTTOM.—Passengers' luggage and parcels not exceeding 56 lb. in weight may be carried, and also goods and minerals arising in and destined for places within the district.

CHESTERFIELD.—Prohibited, except small parcels.

RHONDDA.—Prohibited, except small parcels.



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**USE OF TROLLEY VEHICLES FOR SANITARY PURPOSES, ETC.**

BRADFORD.—Trolley vehicles may be used for conveyance of sanitary refuse, road metals, and materials of the Corporation.

ABERDARE.—Council empowered to use railless route for removal of refuse and for materials and goods for the use of the Council.

BRIGHTON COMPANY.—No provision.

HOVE.—Corporation may use trolley vehicles for sanitary purposes within the borough, or for the conveyance of road metal or other materials required for the works of the Corporation.

RAMSBOTTOM.—Trolley vehicles may be used for the conveyance of scavenging stuffs, road metals, and other materials required for the works of the Council.

CHESTERFIELD.—Trolley vehicles may be used for conveyance of scavenging stuffs, road metal, or other material required for the works of the Corporation, but the weight of any vehicle with its load shall not exceed five tons.

No provision in the other Acts.

**FARES.**

In all cases, with the exception of the Brighton company, the Hove Corporation, the Brighton Corporation, and the North Ormesby company, the maximum fare chargeable is 1d. per mile or fraction of a mile, the minimum charge being 1d.

The four exceptions named may charge a minimum fare of 2d.

**WORKMEN'S FARES.**

In all cases provision is made for workmen's fares at the rate of ½d. per mile or fraction of a mile, with a minimum fare of 1d., with the exception of the Brighton company.

**WORKMEN'S CARS.**

The usual model clause is embodied in most of the Acts, but no provision seems to have been made in the case of Dundee and the Brighton company.

**NEW ROUTES.**

DUNDEE.—Power to run over any road or street within the borough.

LEEDS.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes *within the city*. Trolley vehicles may be authorised by any Provisional Order under the Tramways Act, 1870, and may be used in lieu of tramways or pending construction thereof.

BRADFORD.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes *within the city*. Any Provisional Order under the Tramways Act, 1870, authorising the construction of tramways in the city may authorise the use of trolley vehicles in lieu of or pending construction of tramways.

CHISWICK.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes *within the district*. Any Provisional Order under the Tramways Act, 1870, authorising the construction of tramways may authorise the Council to use trolley vehicles in lieu of or pending construction of tramways.

ROTHERHAM.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any roads *within the borough*. Any Provisional Order under the Tramways Act, 1870, may authorise use of trolley vehicles in lieu of and pending construction of tramways.

HALIFAX.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other route within the borough. Any Provisional Order obtained under the Tramways Act, 1870, authorising construction of tramways in the borough may authorise the use of trolley vehicles upon any route in lieu of and pending construction of tramways.

NORTHAMPTON.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes within the borough. Trolley vehicles may be authorised by any Provisional Order under the Tramways Act, 1870, and may be used in lieu of and pending construction of tramways.

ABERDARE.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes within the Council's district. Trolley vehicles may be authorised by any Provisional Order under the Tramways Act, 1870, and may be used in lieu of and pending construction of tramways.

BRIGHTON COMPANY.—No provision.

HOVE.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes, but the Board of Trade shall not make Provisional Order for any route outside the borough without the consent of the district local authority and the road authority. Any Provisional Order obtained under the Tramways Act, 1870, may authorise the use of trolley vehicles in lieu of and pending construction of tramways.

BRIGHTON CORPORATION.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes, but the Board of Trade shall not make a Provisional Order without the consent of the local authority of the district in which the route is situate and of the road authority.

SHEFFIELD.—Board of Trade empowered to authorise the use of trolley vehicles upon any other routes within the city. Any Provisional Order obtained under the Tramways Act, 1870, authorising the construction of tramways in the city may authorise the use of trolley vehicles upon any routes in lieu of or pending construction of tramways.

KEIGHLEY.—Board of Trade empowered to authorise the use of trolley vehicles upon any other routes within the borough. Any Provisional Order obtained under the Tramways Act, 1870, authorising the construction of tramways in the borough may authorise the use of trolley vehicles in lieu of or pending construction of tramways.

ORMESBY.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes, but the Board of Trade shall not make a Provisional Order relating to any county main road without the consent of the County Council of the riding. Another section provides that for the protection of the Imperial Tramways Company, Limited, no Provisional Order shall be authorised in the municipal boroughs of Middlesbrough, Thornaby-on-Tees, or Stockton-on-Tees, or in the parishes of Linthorpe and Norton. A further section provides that for the protection of the North Eastern Railway Company, the Ormesby company shall not make an application to the Board of Trade for a Provisional Order to authorise the placing, erection, or laying down of any trolley vehicle equipment along any route not within the urban districts of South Bank in Normanby or Eston as existing at the passing of the Act, nor within so much of the urban district of Ormesby as is within the parliamentary borough of Middlesbrough as so existing.

STOCKPORT.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other roads within the borough. Any Provisional Order under the Tramways Act, 1870, may authorise the use of trolley vehicles in lieu of and pending construction of tramways.

RAMSBOTTOM.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other routes within the district. Any Provisional Order under the Tramways Act, 1870, may authorise the use of trolley cars in lieu of and pending construction of tramways.

CHESTERFIELD.—Board of Trade empowered to make Provisional Order authorising the use of trolley vehicles upon any other road within the borough. Any Provisional Order obtained by the Corporation under the Tramways Act, 1870, may authorise the use of trolley vehicles in lieu of and pending construction of tramways.

RHONDDA.—No provision.

**CONVERSION OF TROLLEY SYSTEM TO TRAMWAYS.**

RAMSBOTTOM.—Council empowered to convert trolley system into tramways by laying down rails, etc., and after conversion the Order of 1903 obtained by the Council to apply to the tramways resulting from this conversion.

**THROUGH RUNNING AND INTERCHANGE OF TRAFFIC.**

BRADFORD.—Corporation have power to arrange.

CHISWICK.—Council empowered to make working agreement and interchange traffic with the London United Tramways, Limited.

HOVE.—Special provision for interchange of traffic between the Brighton Corporation and Hove Corporation, and general powers to arrange through running with any other owners.

BRIGHTON CORPORATION.—Authority to make agreements for running powers with the Hove Corporation and any other local authority with the approval of the Board of Trade.

KEIGHLEY.—Trolley vehicles not to be used as part of a through route to and from any place in competition with the Midland or Great Northern Railways.

STOCKPORT.—Corporation may make agreements for through running and joint working and may enter into agreement with the Manchester Corporation to use certain tramway wires.

No provision in the other Acts.

**TRAILER CARS.**

KEIGHLEY.—May not be used without the consent of the Board of Trade and without the consent of the County Council.

ORMESBY.—Board of Trade's consent necessary.

CHESTERFIELD.—Prohibited.

RHONDDA.—Not to be used without the consent of the Board of Trade.

No provision in the other Acts.

**ROAD WIDENINGS.**

ROTHERHAM.—Main roads to be widened by the Corporation to a width of not less than 27 ft. when required by the County Council, three-fourths of the cost to be borne by the Corporation and one-fourth by the County Council. A footpath not exceeding 6 ft. to be provided by the Corporation to the County Council's requirements. It is provided that where at any place the acquisition of any dwelling-house or permanent building used for industrial or business purposes is necessary for the execution of any such widening, or if the widening involves the disturbance, alteration, or interference with any railway line, or railway or other bridge, the Corporation shall not be required to widen the said carriageway to any greater extent than can be effected without such acquisition or interference.

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ABERDARE.—The Council to pay the County Council one-half the cost of executing specified works for road widening and improvements.

SHEFFIELD.—Routes 3, 4, and 5 not to be opened until required widenings have been made to the satisfaction of the Board of Trade. The Sheffield and Glossop main road in the rural district of Wrotley to be widened if so required by the County Council before trolley vehicles are run. The carriageway not to be less than 27 ft., with footpath not exceeding 6 ft. The roadside waste may be utilised, and the Corporation is not required to comply with the obligations of this section to any greater extent than practicable by using the roadside waste.

KEIGHLEY.—The Corporation is prohibited running trolley vehicles on any county or district road unless the carriageway is 15 ft. in width. In case of a district road where the carriageway is less than 17 ft. in width, the road authority may determine that the road shall be widened so as to provide a carriageway not exceeding 17 ft. in width with footpath or footpaths of the same width as the existing footpaths, but the Board of Trade may determine that the widening is unnecessary, and may also decide that the road be widened to between 15 and 17 ft. The Corporation shall contribute one-third of the cost of such widening. In the case of a county road, where the carriageway is less than 20 ft. in width, the road authority may determine that the road shall be widened so as to provide a carriageway not exceeding 20 ft. in width, with footpath or footpaths of the same width as the existing footpaths. The Board of Trade may determine that the widening is unnecessary, or that a width of more than 15 ft. and less than 20 ft. is necessary, in which case the road shall be widened as determined by the Board of Trade. The Corporation to pay the County Council one-third of the cost.

ORMESBY.—Trolley vehicles not to be used on the Stockton and Redcar main road where the road between fences is less than 36 ft. in width until the road is widened to 36 ft., but the necessary widening appears to be at the expense of the County Council.

CHESTERFIELD.—The Corporation is prohibited running trolley vehicles along any road unless there is a carriageway of not less than 17 ft. in width and a footpath of not less than 4 ft. in width. The road authority shall widen the roads so as to provide in the case of a main road a carriageway of 20 ft. in width, and in the case of district road a carriageway of 17 ft. in width, and where there is an existing footpath or footpaths a footpath or footpaths of the same width as now existing, provided that where the existing footpath exceeds 6 ft. in width in the case of a main road or 4 ft. in the case of a district road, the footpaths shall be reduced to such widths. Where there is no footpath the road authority in addition to widening the carriageway shall provide a footpath of not less than 4 ft. in width, but this provision shall not apply in the case of a main road where the carriageway exceeds 24 ft. in width, or a district road where the carriageway exceeds 21 ft. in width, or in the case of a main road with a total width between fences of 27 ft. and a district road of 24 ft. It is also provided that where, for the execution of such widening, the acquisition of a building is necessary or disturbance, alteration, or interference with any railway or bridge is involved, the road authority shall not be required to widen the road to any greater extent than can be effected without such acquisition or disturbance, and the Corporation is not required to contribute to the cost of widening any bridge or to the cost of acquiring any building for the purpose of widening any road. Upon the road authority carrying out any widening the Corporation shall contribute one-third of the cost.

RHONDDA.—The company to pay one-third of the cost of widening the roads so as to provide a carriageway of 17 ft. with a footpath of 4 ft. The Council to carry out the widening, and to adapt the roads for the running of trolley vehicles. The total sum payable by the company not to exceed £1,333.

No provision in the other Acts.

### PAVING AT TERMINI.

The following clause appears in the Rotherham Corporation Act:

ROTHERHAM.—County Council may require at the commencement or terminus of any route that the road shall be paved with granite or other setts to the full width of the carriageway and for a length not exceeding 30 ft.

### IMPROVEMENT OF ROAD SURFACES.

The following clauses appear in the Acts of the Aberdare Urban District Council and the Ramsbottom Urban District Council:

ABERDARE—*Special Provision*.—County Council shall, within two months after the overhead equipment has been erected on railless route No. 3, put the main road into suitable condition, so that the trolley cars may run over the same. The Aberdare Council to pay one-half of the reasonable cost of doing the work.

RAMSBOTTOM.—Before the system is opened for traffic the Urban District Council to replace macadam on routes over which system will run, with tar macadam on proper foundations, to the satisfaction of the county surveyor. One-fourth of the cost to be paid by the Urban District Council.

### ROAD MAINTENANCE.

ROTHERHAM.—The Corporation must pay to the County Council an annual sum equal to ¾d. per mile run by the trolley vehicles over the main roads, or, alternatively, the sum of £150 per annum, whichever may be the greater. If this payment proves inadequate to recoup the County Council for the extra expense incurred by them in maintaining the roads, the Corporation shall pay the additional sum. The sum of £65 per annum has also to be paid to the Rotherham Rural District Council in relation to roads and bridges repairable by the Council, and all protective clauses apply to this Council as if it were the County Council.

BRIGHTON COMPANY.—The company to pay to the County Council a contribution of ½d. per car-mile run by the company's vehicles over the main roads between the eastern boundary of the county borough of Brighton and Rottingdean, or, alternatively, the sum of £120 a year, whichever shall be the greater. It is also provided that if the sum of ½d. per car-mile proves inadequate to recoup the County Council for the extra expense incurred by them, the company shall pay such additional sum as may be agreed.

SHEFFIELD.—The surveyor of the road authority has power to certify that extraordinary expenses have been incurred by reason of damage caused by excessive weight or extraordinary traffic of the trolley vehicles, and the road authority may sue the Corporation for the recovery of additional expenses they have incurred. It is provided that trolley vehicles shall not be deemed to be excessive in weight, and the use thereof shall not be deemed to be extraordinary traffic by reason only of their being trolley vehicles, or of their being authorised by this Act.

KEIGHLEY.—See section 23 of Highways and Locomotive (Amendment) Act, 1878, as amended by section 12 of the Locomotive Act, 1898. It is also provided that the trolley vehicles shall not be deemed to be excessive in weight, and the use thereof extraordinary traffic, by reason only of their being trolley vehicles.

RAMSBOTTOM.—If it is found that the use of trolley cars increases the cost of repair and maintenance of main roads, the increased cost is not to be included in the annual payment which the County Council makes to the Urban District Council in respect of main roads (under section 11 of the Local Government Act, 1889).

CHESTERFIELD.—The Corporation shall pay any extra expenses incurred by the road authority in repairing and maintaining the roads upon which trolley vehicles or motor omnibuses are run, and it is provided that, at the expiration of the first year, the sum to be paid shall be agreed between the Corporation and the road authority (or, failing agreement, by arbitration), and at the expiration of every subsequent period of three years, or any less period that may be agreed, the two authorities shall agree or arbitrate about the extra expense involved in road maintenance and the payment to be made by the Corporation to the road authority.

RHONDDA.—The company to pay one-third of the extra cost incurred by the Council in maintaining the roads by reason of the running of trolley vehicles, but it is provided that the one-third shall not exceed ¾d. per car-mile.

No provision in the other Acts.

### RAILWAY BRIDGES AND APPROACHES.

DUNDEE.—Worked under special Act.

LEEDS.—Protective clause for railway companies as regards construction and user of works. The Corporation to pay the companies the cost of any alteration of bridges by reason of the existence of or user of works or apparatus.

BRADFORD.—Protective clause for railway companies as regards construction and user of works. The Corporation to pay to the companies the cost of any alteration of bridges by reason of the existence or user of works or apparatus.

ROTHERHAM.—There is a protective clause for several railway companies providing that all works authorised by the Act shall be executed so as not to injuriously affect any bridge or approaches, and the Corporation is required to make good any damage. It is also provided that the Corporation shall pay to the companies any additional expense reasonably incurred by them in the maintenance or reconstruction of any bridge or approaches by reason of the existence or user of the works and apparatus.

HALIFAX.—Authorised works to be executed so as not to interfere with the structure of any bridge, approaches, or works, and the Corporation to use the authorised works and also the trolley vehicles so as not to injuriously affect any such bridge, approaches, or works or property of the company, and in the event of any injury being occasioned by the construction, maintenance, user, or removal of the authorised works or the said trolley vehicles upon, across, under, or over the same, the company may make good the injury and may recover from the Corporation the reasonable expense of so doing. It is also provided that if by reason of the construction of the various works over the bridges or other works of the company, or by the user of the authorised works or by the user of trolley vehicles it becomes necessary to strengthen any bridge or other works of the company, the company shall notify the Corporation and execute such works as may be reasonably necessary, the expense of so doing to be repaid to them by the Corporation. The Corporation shall pay to the company any additional expense which the company may reasonably incur in effecting any widening, lengthening, strengthening, reconstructing, altering,

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or repairing any bridge or in the maintenance of any bridge, approach, or other work of the company by reason of the existence or user of the authorised works, and it is provided that where the necessity for such strengthening, altering, or repairing is due to the construction or user of the authorised works or the user of trolley vehicles the Corporation shall repay to the company the whole cost of the works.

ABERDARE.—The Council required to construct and maintain certain bridges over the Great Western Railway.

HOVE.—Should the use of trolley vehicles or the construction of the overhead equipment render it necessary for the bridges belonging to the London, Brighton, and South Coast Railway to be reconstructed or strengthened the Corporation is required to pay the cost.

BRIGHTON CORPORATION.—The Corporation shall construct, maintain, and use the trolley vehicles and equipment and maintain and use the trolley vehicles so as not to injuriously affect the structure of bridges, and in the event of injury they shall pay the railway company the reasonable expense of making good. Should the construction of equipment for the working of trolley vehicles over the bridges of the London, Brighton, and South Coast Railway Company necessitate the reconstruction or strengthening of the company's bridges, the Corporation shall defray the cost.

KEIGHLEY.—The Corporation to construct, maintain, and use any works authorised by the Act without damaging bridges or approaches, and to pay the cost of making good any damage.

ORMESBY.—Special clause for the erection and maintenance of bridge over the North Eastern Railway.

RAMSBOTTOM.—Should any damage be done to the Lancashire and Yorkshire Railway Company's bridges in construction, maintenance, user, or removal of works or apparatus the railway company may recover from the Council the reasonable expenses incurred in making good.

CHESTERFIELD.—The Corporation shall construct, maintain, and use the works and apparatus on all bridges and bridge approaches belonging to the Great Central Railway Company so as not to injuriously affect any such bridges or approaches, and in the event of any injury being occasioned, the Great Central Company may recover from the Corporation.

No provision in the other Acts.

### COUNTY AND MAIN ROAD BRIDGES.

ROTHERHAM.—Contribution of £400 to be paid by the Corporation provided Canklow bridge is widened or rebuilt by the County Council, and the Corporation is responsible for injury or damage to county bridges.

SHEFFIELD.—Should the use of trolley vehicles injuriously affect any county or main road bridges the Corporation shall restore such bridges to the satisfaction of the County Council.

KEIGHLEY.—The Corporation is not required to contribute to the cost of widening any bridge. There is a protective clause for the County Council making the Corporation responsible for all losses, damages, and expenses occasioned to the County Council, by reason of the execution or failure of any of the works authorised by the Act.

CHESTERFIELD.—The Corporation is not required to contribute to the cost of widening any bridge.

### PROTECTION OF GAS COMPANY.

BRIGHTON COMPANY.—The company shall make good all damage done to apparatus of the gas company, and shall recompense the gas company for any loss or damage which they may sustain by reason of any interference with their apparatus, or by the working of trolley cars, and if the supply of gas is interrupted the company shall compensate the gas company.

HOVE.—The Act does not relieve the Corporation from any liability for damage which the gas company may sustain by reason or in consequence of any injury caused to their apparatus by reason of the working of trolley vehicles.

BRIGHTON CORPORATION.—The Act does not relieve the Corporation from any liability for damage which the gas company may sustain by reason or in consequence of any injury caused to their apparatus by reason of working of trolley vehicles.

ORMESBY.—The company to make full compensation to the gas company for any loss or damage the gas company may sustain by reason of any interference with their mains, pipes, and apparatus, or by reason of the running or working of trolley vehicles, or any omnibuses or vans in connection therewith, and if the supply of gas is interrupted or interfered with the company shall compensate the gas company and indemnify them against all claims and losses, but no claim shall lie unless the pipes and apparatus are at least 18 in. below the surface of the carriageway.

### DAMAGE TO DRAINS, ETC.

ORMESBY.—The company to pay compensation for any damage to sewers or drains by reason of the running of trolley vehicles.

### REMOVAL OF SNOW.

ORMESBY.—The company may remove snow, but is prohibited using salt or other unsuitable material for thawing snow, and the company must not leave snow at the side of the road.

RHONDDA.—The company may remove snow, but is prohibited using salt or other unsuitable material for thawing snow, and the company must not leave snow at the side of the road.

BRIGHTON CORPORATION.—The Corporation may remove snow, but is prohibited using salt or other unsuitable material for thawing snow, and the Corporation must not leave snow at the side of the road.

HALIFAX CORPORATION.—The Corporation may remove snow or other matter impeding the traffic to the side of the road, but so as not to impede or obstruct ordinary traffic. Salt shall not be used for thawing snow, provided that any snow or dirt shall not be allowed to remain at the side of the road, but shall be taken away as soon as reasonably practicable.

### ADVERTISEMENTS ON CARS AND POLES.

The question of advertising is only mentioned in the Acts of the Brighton Company, Brighton Corporation, Keighley, and North Ormesby.

In the case of the Brighton Company, the Brighton Corporation, and the Keighley Corporation, advertisements are prohibited on poles but not on cars, and in the case of North Ormesby, advertisements are not permitted on any trolley vehicular equipment.

### COMPETITION.

The question of competition is only mentinoed in two of the Acts, viz., the Brighton Corporation and the Keighley Corporation. The clauses are as follows:

BRIGHTON CORPORATION.—It is provided that so long as the Corporation shall maintain a service of trolley vehicles in any street in the borough, the omnibus company shall not, without the consent of the Corporation, ply for hire with motor omnibuses along such street.

KEIGHLEY.—Trolley vehicles are not to be used as part of a through route to or from any place in competition with the Midland or Great Northern Railway.

### PURCHASE CLAUSE.

The following clause appears in the Keighley Corporation Act:

KEIGHLEY.—System outside the borough may be purchased after the expiration of 20 years by the Councils concerned on payment of a sum equal to the then value, exclusive of any allowance for past or future profits or compensation.

CHESTERFIELD.—The Act incorporates section 43 of the Tramways Act, 1870, respecting purchase of undertaking by local authorities.

### ACCOUNTS.

There is a provision in all Corporation Acts and Acts granted to local authorities that the accounts of the railless undertaking shall be kept separate from all other accounts, and, to enable the road authorities to ascertain the mileage of trolley vehicles, the Rotherham Corporation and the Brighton Company are required to keep statements showing the mileage run by each trolley vehicle on the main roads.

### REPAYMENT OF LOANS—PERIOD ALLOWED.

The periods for repayment allowed under the various Acts are as follow: Trolley vehicles, 10 years; electrical equipment of line, 20; cost of Act, 5; electricity works, 20; land, 60; land for street improvements, 50; land for depots, etc., 55; depot accommodation, 20; bridges, 50 years.

### COST OF OPERATING RAILLESS TROLLEY CARS.

BRADFORD CORPORATION.

Period: From April 1, 1911, to March 31, 1912.

| | Average per Car-mile. | | Amount. £ s. d. | £ s. d. |
|---|---|---|---|---|
| **To TRAFFIC EXPENSES.** | | | | |
| Superintendence... ... ... | '011 | ... | 1 5 10 | |
| Wages of motormen and conductors | 2·836 | ... | 336 12 7 | |
| Wages of other traffic employees... | '090 | ... | 10 13 6 | |
| Cleaning and oiling cars ... ... | '386 | ... | 45 14 10 | |
| Fuel, light, and water for depots ... | '121 | ... | 14 7 1 | |
| Ticket check ... ... ... | '107 | ... | 12 14 4 | |
| Uniforms and badges ... ... | '109 | ... | 12 19 4 | |
| Miscellaneous ... ... ... | '200 | ... | 23 15 2 | |
| | 3·860 | | | 458 2 8 |
| **To GENERAL EXPENSES.** | | | | |
| Salaries of general officers and staff | '098 | ... | 11 12 4 | |
| Administration and establishment expenses, Finance and General Purposes Committee ... ... | '024 | ... | 2 16 7 | |
| Stores expenses ... ... ... | '012 | ... | 1 9 0 | |
| Rates and taxes ... ... ... | '186 | ... | 22 1 7 | |
| Printing and stationery ... ... | '016 | ... | 1 18 5 | |
| Fuel, light, and water for offices ... | '008 | ... | 0 19 8 | |
| Accident, insurances, and compensations ... ... ... | '018 | ... | 2 1 9 | |
| Fire and other insurances ... | '016 | ... | 1 18 1 | |
| Miscellaneous ... ... ... | '070 | ... | 8 6 8 | |
| | '448 | | | 53 4 1 |
| **To GENERAL REPAIRS AND MAINTENANCE.** | | | | |
| Electrical equipment of line ... | '080 | ... | 9 9 10 | |
| Buildings and fixtures ... ... | '034 | ... | 4 1 3 | |
| Workshop tools and sundry plant | '027 | ... | 3 4 7 | |
| Cars ... ... ... ... | '916 | ... | 112 6 0 | |
| | 1·087 | | | 129 1 8 |
| **To POWER EXPENSES.** | | | | |
| Cost of current at 1d. per Board of Trade unit ... ... ... | 1·228 | ... | ... | 145 12 10 |
| Total amount of working expenses | 6·623 | | | £786 1 3 |

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BRADFORD CORPORATION—*continued.*

| | |
|---|---|
| Car-miles run | 28,485 |
| Average traffic revenue per car-mile | 7·148d. |
| Mileage of railless traction route | 1 mile 460 yards |
| Passengers carried | 332,800 |
| Total number of units used | 52,509 |
| Units used per car-mile | 1·26 |
| Average speed per hour | 7·56 miles |
| Average fare charged per mile | 0·8d. |
| Average number of passengers per car-mile | 7·89 |
| Population served | Impossible to say |
| Description of route | Working-class district joining two main tramway routes—Leeds Road and Wakefield Road. Width of roadway generally 30 feet. Steepest gradient 1 in 15. No severe curves. Surface varies. Granite paving and various kinds of macadam in trial lengths, some of which seem to be standing very well. |

COST OF OVERHEAD EQUIPMENT FOR RAILLESS ELECTRIC TRACTION.

| | £ s. d. |
|---|---|
| Poles and cost of planting same, etc. | 1,111 17 0 |
| Overhead wires | 729 13 0 |
| = £1,381 2s. 6d. per mile. | £1,841 10 0 |
| Extras— | |
| Double line to Thornbury depot | 100 0 0 |
| Two meters, boxes, etc. | 25 0 0 |
| Post office account | 189 4 8 |
| Great Northern Railway account | 50 0 0 |
| | £2,205 14 8 |

| | £ s. d. |
|---|---|
| Cost per mile railless: miles, 1¼ | 1,654 6 0 |
| Cost per mile, total: „ 1·8 | 1,225 8 2 |

LEEDS CORPORATION.

Period: From April 1, 1912, to March 31, 1913.

| | Average per Car-mile. | £ s. d. | Amount. £ s. d. |
|---|---|---|---|
| To TRAFFIC EXPENSES. | | | |
| Wages of motormen and conductors | 1·51 | 507 4 3 | |
| Cleaning and oiling cars | 0·42 | 141 8 3 | |
| Ticket check | 0·01 | 4 19 4 | |
| Uniforms and badges | 0·03 | 10 0 0 | |
| Licences | 0·01 | 3 0 0 | 666 11 10 |
| To GENERAL EXPENSES. | 1·98 | | |
| Insurances, workmen's compensation, fire insurance, and health insurance | 0·12 | 38 19 4 | |
| Rates | 0·03 | 8 19 9 | 47 19 1 |
| To GENERAL REPAIRS. | 0·15 | | |
| Electrical equipment of line | 0·05 | 18 8 8 | |
| Cars (including tyres) | 2·07 | 694 3 8 | 712 12 4 |
| To POWER EXPENSES. | 2·12 | | |
| Total mileage, including dead mileage, 82,209 at 0·87 unit per mile = 71,522 units at ·44d. | 0·40 | | 131 2 5 |
| Total working expenses | 4·65 | | £1,558 5 8 |
| To INTEREST & SINKING FUND CHARGES, ELECTRICAL EQUIPMENT OF LINE. | | | |
| Total cost, including alterations £4,715 | | | |
| Period for repayment 20 years. | | | |
| Interest for 12 months | 165 | | |
| Sinking fund for 12 months | 175 | 340 0 0 | |
| Cars, four at £700 = £2,800 | | | |
| Sundry expenses 248 | | | |
| £3,048 | | | |
| Period for repayment 10 years. | | | |
| Interest for 12 months | 106 | | |
| Sinking fund for 12 months | 265 | 371 0 0 | 711 0 0 |
| | 2·11 | | |
| | 6·76 | | £2,269 5 8 |

| | |
|---|---|
| Revenue miles run | 80,605 |
| Mileage of route | 4¼ miles |
| Population served (in addition to that already served by tramways) | 1,400 |
| Passengers carried | 379,271 |
| Total number of units used | 71,522 |
| Average speed per hour | 8 miles |
| Average fare charged per mile | ½d. |
| Average number of passengers per car-mile | 4·7 |

| | £ s. d. |
|---|---|
| Capital expenditure, electrical equipment of route | 4,723 0 7 |
| „ „ railless vehicles | 3,047 19 3 |

ROTHERHAM CORPORATION.

Period: From October 3, 1912, to January 31, 1913.

| | | Per Car-mile. d. | Amount. £ s. d. |
|---|---|---|---|
| WORKING EXPENSES | | 6·61 | 1,072 17 3 |
| INTEREST AND SINKING FUND CHARGES: | | | |
| *Electrical equipment of line* | £5,200 | | |
| Period for repayment, 20 years. Interest and sinking fund at 6½ per cent., £335 16s. 8d. per annum. | | | |
| Per car-mile | | ·69 | 111 18 10 |
| *Cars* | £2,175 | | |
| Period for repayment, 10 years. Interest and sinking fund at 11¼ per cent., £250 2s. 6d. per annum. | | | |
| Per car-mile | | ·51 | 105 6 4 |
| | | 7·81 | £1,389 2 5 |

ROTHERHAM CORPORATION—*continued.*

| | |
|---|---|
| Miles run | 38,918 |
| Passengers carried | 126,028 |
| Population served | 3,991 |
| Number of times population carried per annum | 94·8 |
| Receipts per car-mile | 10·07d. |
| Gross profit per car-mile | 3·46d. |
| Working expenses per car-mile | 6·61d. |
| Interest and sinking fund per car-mile | 1·20d.— 7·81d. |
| Net profit per car-mile after all deductions have been made | 2·26d. |
| Net profit after all deductions have been made | £365 4s. 3d. |

[The paper concluded with descriptions of the "Cedes-Stoll," "R.E.T.," "Bremen," and "Filovia" systems of railless traction.]

## RAILLESS TROLLEY CARS v. MOTOR OMNIBUSES.

Mr. H. ENGLAND, as an introduction to his paper, read the following: I am afraid my paper as published will be a disappointment to many of the ardent advocates of trolley cars, and also to those who favour motor 'buses and can see no virtue in anything but these. Through a misunderstanding between our worthy and energetic secretary and myself, my paper was first announced with the title "Railless Trolley Cars *versus* Motor 'Buses," and such a title presupposes a comparative statement of the virtues and failings of each method of traction. My intention was not to traverse the ground that has been so well covered by my able colleagues in this and the Municipal Tramways Association, but rather to place before you all the data possible bearing upon railless traction legislation, analyse and allocate it, so that we should have a handy reference to the various private Acts which have already been passed by Parliament, and, at the same time, we should have a comparison which shows the tendency of legislation and the trend of the Board of Trade's requirements.

To this end I have made digests of all the private Acts, ignoring points which are common to all, such as the protective clauses of the Postmaster-General, etc., and have confined my attention to matters interesting to tramway men contemplating railless traction schemes. I am told the members of this Congress expect something more than this, and will not be satisfied without a duel to the death on the respective merits of the two systems. Well, gentlemen, I am quite willing to give you a text on which you can base your criticism, and before I sit down I will try to give enough ammunition to keep you firing this morning.

A brief review of the proceedings of our Association on this subject may not be out of place at this stage. At the Dublin Congress of the Association, held in May, 1910, I presented a paper on "Railless Traction." We had just begun to realise that railless traction was a "live proposition," as our American cousins would say, and also that our Continental neighbours were employing railless trolley cars both for carrying passengers and goods. Much progress has been made since I composed my last paper on this subject, and we can now see six systems of railless cars which are being worked by enterprising Corporations in Great Britain.

At the Swansea Conference last year, Mr. A. H. Pott, chief engineer of the Metropolitan Electric Tramways, Limited, read a paper entitled "The Respective Values of Tramways, Motor 'Buses, and Railless Trolley Cars as Means of Transport." That paper dealt very fully with the subject, and presented the arguments for each method of transport so very clearly, that it is quite unnecessary for me to go over the same ground. The motor 'bus and railless car controversy is practically in the same position to-day as then, and although motor 'buses and trolley cars have been greatly improved in the interval, the broad lines of argument are the same, and whilst I cannot refrain from asking you to express your opinions on the respective merits and drawbacks of the two systems, I must admit that I am, like many of the members of this Congress and tramway managers generally, an inquirer, and thirsting for information. It would be idle to deny that tramway managers are sharply divided in opinion on this subject, but I think we must all admit that each system has merits that fit it more particularly for certain conditions. I hold no brief for railless traction, and I should not entertain for a moment the idea that railless trolley cars are superior to motor 'buses under all conditions, and certainly would not admit the converse. With your permission I will leave this point for a moment, and deal with it later when directing your attention to the operating costs of railless cars given in the supplement to my paper.

I now want to refer to the subject matter of the paper. I have commented upon the various obligations put upon the Corporations and companies who have had the temerity to go to Parliament for permission to serve the public and to seek to supply a means of transport that will undoubtedly be a great and appreciated boon to thousands, who, up to the present time, have had to be satisfied with the humble, slow, but useful, carrier's conveyance, or, at the best, a wagonette service which ran whenever the proprietors felt in the humour to put the horse to this use, instead of the more lucrative manure leading, furniture removing, and similar jobs the poor gee-gee did between its journeys from the market town to the adjacent villages. All of us know that an abortive attempt was made by the Government to pass a Light Railway Bill last year, and this bill included clauses seeking to facilitate the promotion of trackless trolley schemes, and I have dealt fully with this in my paper.

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In introducing the paper this morning, and inviting you to offer freely criticism on the various points raised, I desire to emphasise the most important clauses of the various private railless Acts. These points are the use of trolley vehicles for transporting goods, minerals, and merchandise; Parliamentary powers to enter into working agreements for through running and interchange of traffic; the powers of the Board of Trade to authorise new routes in the area when once railless powers have been obtained, road widenings, road maintenance; and the protective clauses obtained by the railway companies, gas companies, and local authorities. The most important is undoubtedly the question of road maintenance, and too much stress cannot be put upon this, as it strikes at the very root of railless traction, and further promotions and extensions will be governed largely by the amount of tax which Parliament puts upon the industry for road maintenance purposes. Whether our leanings are to motor 'buses or trolley cars, we shall all agree that a tax which is applicable only to one particular form of mechanical traction is inequitable. It cannot be proved that trolley cars cause more damage to roads than, for instance, motor 'buses or commercial wagons do, and from personal observations of the road surfaces on trolley car routes in Leeds, Bradford, and Rotherham, I have formed the opinion that trolley cars are not severe on roads, and I have seen far more damage done in my own area by motor wagons and traction engines than would be done in a similar period by a regular service of trolley cars. By some means or other all forms of

**Mr. Harry England.**

traction should pay for the roads they use, according to the weight and speed of the vehicle and the mileage run. I am not prepared to say how this can be arrived at, or how an equitable tax can be imposed, and I suppose my motor 'bus friends will say they already pay by means of the petrol tax. This is not so, because the amount realised by the petrol tax is not devoted to road maintenance, but to road improvements, and, even if it were so, the amount charged under this tax is inadequate when viewed in the light of railless traction legislation, and many of our friends who have had road maintenance put upon them by Parliament for trolley cars would be delighted to exchange the petrol tax for the sum they will be called upon to pay. Again, promoters of railless schemes are made responsible for a portion, if not the whole, of the capital cost of road widenings and improvements, so the arguments used by motor 'bus advocates on this question are unsound.

It is difficult to criticise without appearing to be biassed, but I am attempting to put this question as it appears to me, and I cannot refrain from saying that on this point of road maintenance motor 'buses win all along the line. Freed from road widenings, from road maintenance, from local rates, and taxes (except in the district where the depot is situate), the comparative beggarly amount paid by means of the petrol tax is said to be an offset against these advantages.

I am against any road maintenance charges for either motor 'buses or trolley cars until all road users are compelled to pay a fair sum for the use they make of the roads. Roads are costing more to maintain by hundreds of pounds sterling per mile, even where there are no trolley cars or motor 'buses, than they did a few years ago, and to attempt to saddle us with the whole of the extra cost of maintenance is absurd. We shall see a great increase in heavy motor traffic during the next ten years, and road maintenance is bound to grow. No account has been taken of this fact in the various railless traction Acts, and the promoters are saddled in some instances with the whole of the extra cost of upkeep, although they may only be responsible for a small portion.

Whilst speaking on this subject, I take the opportunity of pointing out that none of the railless traction Acts safeguard the promoters in any way. For instance, some of them must pay a minimum sum per car-mile to the road authority, but, on the other hand, the road authority is under no obligation to keep the road in good repair and suitable for trolley car traffic. Perhaps this is an oversight on the part of promoters, and, as one of my friends said when I mentioned the point to him, "It is implied when you pay for a thing that it will be done." My experience of local authorities makes me doubtful, and I certainly should not be content and satisfied to have anything implied. If we are made to pay we should have our money's worth, and any road authority receiving an agreed sum for the extra cost of maintaining roads should be ready to have a clause inserted in the bill ensuring to the operators that they, the road authorities, will do their part in properly maintaining the roads.

The position of the private promoter or limited company desirous of working trolley vehicles is an impossible one if bound to accept similar road maintenance clauses as those in the Acts of Rotherham, the Brighton and Hove Company, Sheffield, Keighley, Ramsbottom, and Chesterfield. In these cases the liability is unascertained and indefinite, and I am afraid it would be quite useless attempting to finance a scheme, however necessary it was, however promising it looked, with this undetermined liability hanging over it. The investor naturally asks for close estimates of income and expenditure, and when one has to admit that under the heading of road maintenance as settled by the clauses of the above Acts one cannot say what the cost will be, the investor is shy and the scheme fails.

As I have said before, it is unjust to put the cost of road maintenance upon either trolley cars or motor 'buses, and allow all other forms of traction to escape, but if Committees are to be dominated by the County Councils Association, and impose these iniquitous burdens, there must be a maximum amount fixed, or the progress of railless schemes will be effectively scotched outside the areas of local authorities, who, of course, may do as they please inside their boundaries. Local authorities contemplating the use of motor 'buses to connect outlying villages will do well to mark the Chesterfield clause. So far as I know, this is the first time Parliament has burdened motor 'buses with the same road maintenance charges as trolley cars, and it is probable that our friends, the road authorities, will urge Committees to insert a similar clause in future Acts. I am afraid time will not allow me to say any more on this question, but I do hope that strenuous fights will be made on any future bills, either for trolley car or motor 'bus powers, against the imposition of road maintenance charges.

I do not propose to say much on the question of road widenings and improvements, because one must be guided by local circumstances, and I can quite understand the promoter of a scheme agreeing to carry out improvements calculated to facilitate the working of his vehicles. Perhaps local authorities are grasping in cases of this sort, and the improvements ought to be made by themselves irrespective of trolley or 'bus traffic, but so long as the amount is strictly reasonable, and the local authority is agreeable to pay a portion of the cost, I should not boggle over this point. Unlike road maintenance, the cost is not a continuing one, and promoters can estimate their liability with some certainty. It has been amply demonstrated that trolley cars and motor 'buses can be safely run on roads wide enough to accommodate ordinary traffic, and often there is no occasion for the widenings insisted upon by the road authorities. Unfortunately, the supreme road authority is, in most cases, the County Council, located miles and miles away from the district interested, and although the Urban and Rural Councils may be strongly in favour of the scheme, the ratepayers clamouring for it, and the comfort and benefits it will bring, still, with the exception of the solitary representative of the district on the County Council, that august body says, "Widen or die." Whether we choose to die in that sense depends upon the extent of the financial burden sought to be put upon us.

The other matters concerning roads are the protective clauses of the railway companies, the gas companies, county and main road bridges, and, in the case of the North Ormesby Company, liability for damage to drains and sewers. In the paper before you I have pointed out that the words "use of trolley vehicles" are, in my opinion, objectionable, and the railway companies are not entitled to any such protection. I take it that the railway companies are compelled to maintain their bridges so that they may be used by all road traffic, and this is another case of attempting to put all the liability for damage to bridges upon one road user. The gas companies in Brighton, Hove, and the North Ormesby areas have obtained

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protective clauses, and in North Ormesby the Urban District Council has a clause making the company responsible for damage to sewers and drains that are laid 18 in. below the road surface. I cannot for the life of me see how any gas company or any local authority will be able to prove that the gas mains or drains and sewers have been damaged by the reason of the running of trolley vehicles, but my antipathy to such clauses is the opening provided for litigation and expense in defending unjust claims.

It is almost the general regulation that no trolley vehicle must exceed the weight of five tons loaded, and clauses such as those mentioned are ridiculous, when we know that 15-ton road rollers, trolleys conveying steam boilers weighing 27 tons, and heavy loads of all descriptions are pulled over the same roads. The same arguments apply to county and main road bridges, and it is only in the Sheffield and Rotherham Acts that we find the bridge clauses.

My colleague, Mr. Edwardes, dealt with the carriage of goods and merchandise, from a tramway standpoint, in his paper read and discussed yesterday. Every argument he advanced is applicable to railless traction, and because connections can be made to mills, warehouses, works, docks, and railway goods yards, at a very low capital cost, perhaps there is even greater scope for trolley vehicles than for cars running upon rails. I do not understand the attitude of Parliament on this question, and, as I have stated in my paper, I believe the railway companies are pursuing a mistaken policy, and it would be to their interests to encourage and not oppose the transport of goods between their termini and consumers by tramway goods wagons, trolley cars, or indeed any system that will ensure quick and cheap delivery. I am surprised to find the neglect there has been, as disclosed by the various Acts, to obtain powers to enter into agreements for through working and interchange of traffic.

We are all alive to the fact that every village of moderate size must sooner or later be provided with better transport facilities than it enjoys at present, and every promoter, whether municipality or company, should be prepared to make connections with adjacent systems, so that the full benefits of through carriage of passengers can be ensured. It is futile to say there is no need in any particular case for such powers, because none of us can say with certainty what the next few months or years will bring forth, and means of transport may be provided in places which to-day seem somewhat unlikely. I do not wish to labour this point, but the full significance of it was brought home to me only last Thursday when I found that a company and Corporation actually desirous of entering into a running powers agreement could not do so because the Corporation had failed to take Parliamentary powers to make such agreements. This means that a Provisional Order must be promoted, the loss of at least 12 months' time, and the expenditure of a considerable sum of money. The Board of Trade has power, under the Acts obtained by local authorities, to make Provisional Orders authorising the use of trolley vehicles upon any other routes within the area of the authority, but only in the Acts obtained by the Hove Corporation, the Brighton Corporation, and North Ormesby Company, is permission given to the Board of Trade to go further than this and authorise routes outside the boundaries.

The sense of the words used in the Hove and the Brighton Acts is that the Board of Trade may make Provisional Orders authorising the use of trolley vehicles upon any other routes, providing the consent of the district and road authorities is obtained. North Ormesby Company must obtain the consent of the County Council. This is a valuable provision, because the expense of future applications to Parliament may be saved, and I cannot see any reason why similar clauses could not have been embodied in other Acts. In my criticism of the provisions of the various private Acts, I have written a few lines on the snow removal clause, and I draw your attention to this, but I do not think it necessary to add anything to what I have written. Those of you who have done me the honour to read my paper will be acquainted with the other less important points, and any I have failed to emphasise, I hope will be brought out in discussion.

I now ask your indulgence for a few moments to refer to the operating costs of trolley vehicles, as disclosed by the figures supplied to me by the general managers of the Leeds, Bradford, and Rotherham systems, and printed at the end of my paper. The total working expenses in Bradford amount to 6·623d., in Leeds 4·65d., and in Rotherham 6·61d. There is a marked difference between Leeds costs and Bradford and Rotherham, and I think this is accounted for by the fact that Mr. Hamilton has not charged against the railless cars, management, and a proportion of his standing charges. Mr. Hamilton has charged all additional outgoings occasioned by the trolley cars, and it is a matter of opinion whether to those figures should be added an amount to cover the cost of management, which, I may remark, has not been increased in the slightest degree by this service. The interest and sinking fund repayments per car-mile are—Leeds 2·11d., Rotherham 1·20d., and Bradford 2·66d., and the total costs, including depreciation of overhead line on a 20 years' basis and vehicles 10 years, are—Leeds 6·75d., Rotherham 7·81d., Bradford 9·284d. I think it should be clearly understood that the routes in Bradford and Leeds cannot be regarded as having been constructed on a strictly commercial basis. By this I mean that any company expecting a reasonable return on the capital expended would not have entertained the idea of building either of these routes, and this fact not only affects the revenue but also the expenditure. The system in Bradford, 1¼ miles in length, connects two tramway routes in the suburbs, and I must admit that the traffic has exceeded my expectations, but the vehicles cannot be worked to their fullest mileage capacity, the number of car-miles run per annum is small, the consequence being that the working expenses and the capital costs per car-mile are higher than they otherwise would be.

The Leeds system, from the City Square to Farnley, a route of 4¼ miles, serves a population of 1,500 persons, and cannot by any stretch of imagination, be regarded as a promising financial proposition. The greater mileage run by the Leeds cars will obviously affect the cost per car-mile, and this fact should be taken into account when comparing operating costs. The Rotherham scheme is different. This route makes a junction with a tramway terminus, about a mile from the centre of the town, and is 4¾ miles in length, serving an estimated population of 4,000 persons. The earning power of trolley cars can only be judged by the results in Rotherham, and I hope my friends, who are not fully acquainted with local circumstances, will not form an erroneous impression of the revenue to be derived from railless traction. The Rotherham results are highly satisfactory, and, not only so, but the revenue per car-mile of the connecting tramway has increased from 6·485d. to 10·126d. Then considering working expenses, it must not be overlooked that the vehicles in use are more or less experimental. The "niggers" have been found, and during the next few months a car will be in use which will undoubtedly be a great advance on anything now running. I have refrained from comparing the operating costs of motor 'buses and trolley cars, but I guess my friends will rectify this omission. Most of us are concerned with provincial conditions, with hills and indifferent road surfaces, and I trust you will not assail me with figures garnered from the metropolis. You must appreciate the difference between London and its suburbs and the provinces, and we are all aware that motor 'bus results are obtained in London which we could not hope to get in the cold and dreary north. I trust you will not spare me if you find anything in my expressed opinions to criticise, and if I have done something to place the subject of railless traction plainly before you, to throw some light upon the present state of legislation, I shall feel amply repaid for any trouble I have taken.

## DISCUSSION ON MR. ENGLAND'S PAPER.

Alderman W. Ivey (West Ham) complimented the vice-chairman on the very able and impartial way in which he had placed the matter before them. He had provided them not only with one paper but with three. He was glad that Mr. England acknowledged the differences on this subject so far as it applied to the provinces and the metropolitan area. In the metropolis they were troubled with conditions that those in the provinces knew nothing of, except by reading about them. It seemed to him that though they could thank the Government for the Light Railways and Tramways Bill, yet he did not think they could thank them for very much after all, because in two or three instances the difficulties that surrounded them, instead of being more easy to surmount, were greater than before. If Parliament would only treat all that class of vehicles which dealt with passenger traffic alone, not private vehicles, but motor omnibuses, railless trolley cars, and so on, in exactly the same way as they treated the trams, then the greater part of their trouble would disappear. At any rate, that was the way it appeared to them in the metropolis. In London they had to provide a very good permanent way and maintain it for other vehicles to use, but what they most keenly felt was the excessive competition brought about by the motor omnibuses, which greatly affected them as tramway owning authorities in the metropolitan area. Regarding the operating costs of trolley vehicles, as shown by figures supplied to Mr. England by the general managers at Leeds, Bradford, and Rotherham, he did not think it was quite fair that Mr. Hamilton should not have included something for management costs in the Leeds figures. It was unfair to saddle on to a tramway undertaking a large addition of this kind without putting down something for the cost of management. If Mr. Hamilton had to provide a new undertaking in Leeds, with the management entirely apart from the existing tramway, he would have to provide for management costs from beginning to end. Why should a new system escape the whole of the management charges simply because it was an extension to an existing system? He hardly thought this was a fair return, and if they added the management charges he did not think that railless traction presented a position which was very much better than the tramways. While thanking the Government, and also Mr. Arthur Stanley, whom they looked upon as the exponent of the tramways and road transport systems in the House of Commons, they hoped it would be understood that whatever the last bill had done for them, it had not satisfied them, and they were still looking to Parliament to promote a bill in the interests of road traffic for passengers that would bring all undertakings into line and take away many of the disabilities from which they now suffered.

Mr. William Clough (general manager of Bury Corporation Tramways) said there was a stipulation in various Acts that the accounts of

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the railless undertakings should be kept separate, and he wondered if Mr. England could tell them how Leeds, for instance, had managed to get outside that stipulation. It was only right that they should have these figures made more distinct, because some poor little urban district, basing its expenditure on these figures, might do so with fatal results. He did not propose to deal with the Leeds figures except to compare them with those of Bradford, where a comparison could be made. In the Bradford figures there was an item that was extraordinarily high—the wages of motormen and conductors, 2·836d. per car-mile; and while they were prepared to accept what was said about time lost in lying over, both vehicles made good speed per hour, Bradford 7·56 miles per hour, and Leeds 8 miles. There was also a big difference in the number of units per car-mile used by these vehicles In the case of Bradford it was 1·25 and in the case of Leeds ·87. They were told last year that these trackless cars could be run with 50 per cent. less energy than the tramcars. At Bradford it was certainly not 50 per cent. less. Again, in Leeds the cost of electricity was low—·44d per unit was an extremely low figure, and he thought that without explanation it was rather misleading. If they took Bradford's figures of 6·623d. per car-mile for total working expenses, they must add interest and sinking fund, but they got it in the case of Leeds, and there would not be much difference between one and the other per car-mile as regarded capital expenditure. If they added 2·11d. for interest and sinking fund to the Bradford figure of 6·623d., they got 8·733d., and on to that they had to put road maintenance, which he did not think they could get out of for less than ·375d., which made a total of 9·108d. His point in connection with these figures was that they were part of an existing system, and with a trackless trolley system working in that way, there must be expenses that were not included. He hoped that in twelve months' time he would be able to give them some figures arrived at on a separate basis. The district of Ramsbottom, which was within three miles of his own system, was putting up a trackless trolley scheme, of which he was to have control, and he would endeavour to get out figures as for an entirely separate trackless trolley system.

Mr. C. W. Shepherd (general manager of the Edinburgh and District Tramways Company) agreed with what had been said about the development of districts by the trackless trolley system. It could hardly be called an urban district that was being served at Leeds, although the system went almost into the centre of the city. The earning capacity during the week time was deplorable. From the Monday to the Friday he believed the earnings came out at 2¾d. per mile, and on the Saturday and Sunday went up to as much as 2s. 6d. and 2s. 7d. per car-mile. The only thing the system had developed in Leeds was the value of the public-houses at the terminus. He was told that the value of one place had been increased from about £1,000 to about £6,000. The district tapped by Bradford was the most populous part of the Bradford area, and he could quite understand the paying part of that route Still, he thought motor 'buses would always be more advantageous than trackless trolleys, even in a big system like Leeds or Manchester, when they had to tap these urban districts. Sometimes in catering for heavy traffic the tramway system was taxed to its utmost, and not another vehicle could be put on the line. Motor 'buses could be far better used for that spare traffic, and would be more remunerative than the trackless trolley system, which was practically lying idle and earning no profit for three parts of the week.

Councillor Isherwood (chairman of the Oldham Corporation Tramways Committee) said that they had the question of trackless trolleys under consideration at Oldham for some time, but they had abandoned it in favour of the motor 'buses. They had now got motor 'buses working to residential districts where tram lines were not laid, and also to an out-district of the borough where there had been no property at all. In the first case they were getting a revenue of 13d. per car-mile, and in the other case where property was not built, but where it was now developing very rapidly, they were getting even in that district a 1s. to 13d., which was made up chiefly of traffic at the week-ends. The expense of the motor 'buses had not been very great, and the rateable value of the town was being extended very greatly in the districts where the 'buses are now running. Motor 'buses, in his opinion, had come to stay, and though they had had several complaints from some of the residents about the shaking caused by the 'buses, and the splashing for want of some effectual mudguard, still, when they took all the disadvantages into consideration, instead of removing the motor 'buses, they would be compelled to increase them.

Councillor J. H. Rodgers (chairman, Newcastle Corporation Tramways Committee) said that when he spoke at the Conference at Swansea a year ago, they had just commenced running motor 'buses in Newcastle. They tried the motor 'buses in preference to the trackless trolleys, and they had them still, although he was prepared to grant that in certain places and under certain circumstances the trackless trolley might be an advantage. These 'buses were used simply as a feeder to their tramcars They were handicapped last year because they commenced with only one 'bus. They were running what was an hour's service, taking 20 to 23 minutes on the outward journey and about 20 minutes to come back, which allowed them a lie-over of five or six minutes at each end. As the season went on they got more 'buses, and they had now four. Although they were hindered last year by having only one 'bus, they carried no less than 277,000 people in the twelve months from May to May. Their earnings were 10d. per car-mile, and their expenses were considerably lighter than they expected about 7d. or 8d., which included depreciation that would write off the cost of the 'bus in five years. He thought they had every reason to be satisfied with the working of the motor 'bus in Newcastle. They only ran them from the country districts to the tramway terminus, and then the great majority of the passengers got on the cars for the city and paid an additional fare. They reckoned that £20 a week thus went to the credit of the tramcars and not to the credit of the 'bus—through the transfers taken from the terminus to the city. If they had put down trackless trolleys they would also have had to put down a sub-station, which would have cost about £7,000 or £8,000, and altogether they would have had a capital charge of about £12,000 to work that portion of the district outside Newcastle by trackless trolleys. They had avoided all that. Their 'buses cost the same as the tramcars, £850, but they were saving the cost of the sub-station and the overhead equipment, which was the difference between a profit and a severe loss. If a main road was up by order of the local authorities, the motor 'bus traffic could be diverted along another road until such time as the regular road was repaired. They could not do that with trackless trolleys. The latter went on one route and were tied to that route. Their experience in Newcastle was that motor 'buses were much preferable to trackless trolleys, for their district at any rate.

Mr. R. H. Humphries (chief engineer of the Birmingham and Midland Tramways Joint Committee) said that considerable progress was being made in the black country with the use of motor 'buses as feeders to existing tramways. In his opinion the great advantage that the motor 'bus had over the trolley car was its mobility. It was not always possible to define at the start what would be the best route for these feeders. He mentioned an instance where it had been found that a certain route that had been tried was not the best, and it had been altered, with the result that there had been a wonderful improvement. They could not have done that very well with the railless trolleys, and therein, he thought, lay the salvation of the motor 'bus and the damnation of the trolley car.

Sir Edward White (chairman of the Highways Committee of the London County Council), in referring to the cost of road maintenance, said that the other other day he gave evidence before a Committee of the House of Commons sitting to inquire into the question of London traffic, and he made an alternative suggestion that either motor 'buses should be called upon to pay something towards the maintenance of the roads, which they destroyed much more than did the tramway cars, or that if there was any further taxation put on the public who availed themselves of this means of locomotion, the tramway authorities should be relieved of the cost of maintaining thoroughfares. There was a time in the earlier days when the owners of tramways should be called upon to repair and maintain a certain portion of the road, because the tramway service was then worked by horses, and in consequence a considerable amount of injury was done to the portion of the road over which they ran. To-day, however, the trams did practically no damage to the roadways. If a new tramway undertaking was required, it would only be right that when they laid down the metals and made the road good at the commencement, they should not be called upon later to continue to repair the road. In that respect they might be put on an equal footing with the motor 'bus companies. He was all in favour of a cheap service of locomotion, and he objected to any tax being put on motor 'buses or tramcars, and he would equalise the present condition of things by removing that charge which in London was a very great tax on their undertakings. There would be some difficulty in getting the local authorities to approve of the course he suggested, but if they looked at it fairly they would see that owing to the severe competition of the motor 'buses, there was a good case why the trams should be relieved of that heavy charge. He knew also how difficult it was to get the House of Commons to take that view, but he thought that with a little hammering, they might eventually give way. The cumbrous system that had to be adopted before they could get permission to lay down a tramway ought to be altered. He thought a joint Committee of the two Houses should sit and hear evidence, because practically the same evidence was produced before the two Committees to-day, and it was a duplication of work that might well be avoided, and it would also mean a considerable reduction of expenditure, especially in the case of London. In the provinces, of course, the conditions were different. In London they had to contend with 28 local road authorities, all of whom were anxious to get something out of the tramways. If the tramways authority wanted to open out a new route, and applied to Parliament for sanction, then several local authorities through whose area they wanted to run would oppose the scheme, with a view to to getting something or other in exchange for their sanction, and very frequently the tramways people had to submit to what one member of the House of Commons called "blackmail," though he preferred to call it negotiation. They had to submit to this negotiation, which they considered was very unfair, or otherwise their bill was thrown out. They tried the other day to get the trackless trolley system through a road on which it would be impossible to make

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the conduit system, from Hackney through Stepney to the Docks. Several local authorities favoured the scheme, but there was one Stepney—that would not have it at any price, and they succeeded in killing the bill, because the consent of the local authorities was required before the matter could be proceeded with. He did not know whether the same thing applied in the provinces, but in London, if the road authority objected, the scheme was vetoed straight away. These things were very unfair indeed, and they needed more freedom in dealing with such matters. The public must be protected, but he did not think these onerous conditions that were placed on the London County Council in providing tramways were at all fair or reasonable. He did not know who could bring the matter up in the House of Commons with any prospects of success under the present conditions, but it would be a step in the direction of Home Rule for London, which he was sure all municipal administrators would heartily welcome.

The Hon. ARTHUR STANLEY moved a hearty vote of thanks to Mr. England for his interesting paper. He thought that if any proof was wanted of the value of these Conferences, they had it that morning, because the discussion was good in two ways. It showed that tramway men throughout the country were fully alive to what might possibly become a serious competition, and the fact that they were alive to it was going to be a help to tramway people instead of a hindrance, and it would draw the attention of those who were not aware of these circumstances to possible competition, and the use they might make of this competition instead of being destroyed by it. He did not propose to discuss the comparative merits of trackless trolleys, motor 'buses, and other forms of traction, but he would like to say a word or two on the general political side of the discussion. As Mr. England had pointed out in his paper, in the Tramways and Light Railways Bill last year, they did do something to the advantage of the tramways and light railways; but owing to what he might call the emendations made to the railless trolley clause, they were obliged to press for the deletion of that clause altogether. It was better to remain as they were rather than get something they did not want. He was coming more and more to the conclusion, which was forced on everyone who studied these matters, that Parliament was the worst body before whom bills for tramways and other forms of traction could come up for sanction. Until they had some radical change in the way the House of Commons Committees did their business, it was possible for almost any obstinate member to make the carrying of a new tramway Act almost an impossibility; at all events, to make it so much more difficult, and so much more expensive, that it gave the promoters reason to wonder whether it was a good thing to bring the bill forward at all. Moreover, they never knew in what mood they might find the House of Commons. They could never be quite certain who was going to attend the Standing Committee. They might pass a bill one day, and not pass it the next, and in these circumstances he thought Parliament was the very worst body that should have to decide upon the promotion of an Act in its early stages. The public had got to be safeguarded, it was true, but that could be perfectly well done when the bill had passed its first stage. He believed himself that the only way of dealing with the problem from the point of view of tramways and trackless cars, motor 'buses, and so on, was that there should be one central road authority in this country. They could go to this central road authority, which would be free from all local jealousies—if they might call them such—and they could ask if they might have a tramway or trackless trolley route, or omnibus route, on some particular road. The central road authority would decide on the general merits of the case, and when that had been done they could look into the local conditions, and see that they all received fair play. As they knew, it would be no very difficult thing to deal with local individual interests after they had once got permission to have a particular form of traction along a particular road. They would also find it very much cheaper.

When the Road Board was first formed, it was largely due to the action of motorists, of whom he was, in a sense, the representative as chairman of the Royal Automobile Club, and he was very anxious to see that Road Board then made into the central authority he had just mentioned. But in this world they had to take what they could get, and they were getting on the whole very much better terms than he expected, because they got the principle established that as far as motor cars were concerned, all the taxation paid by motorists should go directly towards the roads. It was true that it only went towards road improvements and not maintenance, but it was a very great step forward. It did not seem to him to be a very long step forward to say that what applied to motorists should also apply to every section of the road users. He felt very strongly that so far as possible they should get some fair system of taxation of all those who used the roads, and that that taxation should go not only to the improvement of roads but to the maintenance of roads. He did not wish to labour the point, but there was not the smallest doubt that they as tramway men were unfairly taxed. He did not suppose that anyone suffered more than they did in South Lancashire, where they seemed to build their tram tracks simply for the sake of heavy motor lorries that plied between St. Helens and Liverpool. It had been hoped that Parliament would bring in a bill to remedy this state of affairs, but it was not Parliament that should bring this matter forward, but they themselves.

He was rather in a difficulty in the matter, because he had still an active interest in the motor world, and while they, as tramway people, complained that they were unfairly taxed, he had been told not once, but hundreds of times by motorists that by having advocated the petrol tax he had gone far to kill the motor industry of this country. It was good to be optimistic in this matter, and he thought it was not impossible for them to get a fair scheme for the taxation of all those who used the road. He would like it to be the outcome of the Conference that the Executive Committee of the Tramways Association be instructed to go ahead in this matter and confer, if need be, with other bodies. He could answer for it that he would be only too glad to bring in the motoring bodies to confer with the Road Improvement Association, who were a most active and progressive body and had done an immense amount of good to the roads. If they could get forward a conference of that nature to see if they could agree, at all events on some general principle for the guidance of a Central Road Board, he thought the outcome of their present conference in Blackpool would be a very large step towards settling many vexed questions affecting not only tramway people, but all those who used the roads in this country. Mr. England had initiated a discussion which would have far reaching effects. It could not have been done better than by Mr. England, whose support of the Association was absolutely unfailing and unswerving. He knew that Mr. de Turckheim would agree with him that if they lost Mr. England they would very nearly have to shut up shop. (Laughter and applause.)

Mr. ENGLAND said he did not intend to reply at length, though he had come prepared with any amount of literature, expecting to be tackled on the running costs of railless cars and motor 'buses. Some of the figures he had mentioned for Leeds and Bradford had been criticised, but nothing had been said about the cost of running motor 'buses. He had the figures for the cost of running motor 'buses in the provinces, gathered from various systems, so he was prepared for discussion that might have arisen on that point. He had advocated railless cars with the object of promoting discussion, and he was prepared to discuss the capital charges and running costs of both systems, and he could substantiate his argument that it was much cheaper to run railless cars than motor 'buses in provincial towns. Referring to the running costs he had given for trams and railless cars in Leeds and Bradford, Mr. England said he did not think they could criticise the figure for railless cars, because, as he had explained before, there was a lot of lie-over time which could not possibly be utilised. If they increased the mileage run by railless cars by one mile an hour they could make a tremendous difference to the traffic costs. Regarding self-propelled cars, Mr. England said the only place he knew where they were running was Morecambe, and another thing he knew about them was that they vibrated considerably.

He would much rather have motor 'buses than railless trolley cars. He could not see the advantage of putting down a track for self-propelled cars, and for himself, he would not entertain the idea. Referring again to the Leeds figures, Mr. England said that Mr. Hamilton contended he had charged against his railless system every penny that the system had cost, and he had found that other Corporations who were running motor 'buses fell into exactly the same error. But, in fact, it appeared to be the general thing for the manager who adopted either railless cars or motor 'buses not to charge against those systems any proportion of his ordinary standing charges. Perhaps they were wrong, as Alderman Ivey said, but whether they are wrong or not, they wanted to compare likes and not unlikes.

As a tramway man he did not need to employ highly skilled labour in his repair shops, but if he went in for motor 'buses he would want an entirely different class of mechanics who knew all about ignition and carburettors. With the railless system the ordinary rough labourer or handy man in a tramcar depot could do everything that was necessary. Another argument that had been used in favour of motor 'buses was that they could be moved to different roads, but if that argument had been applied and accepted before tram tracks were laid there would have been no tram tracks laid in this country.

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Mr. A. V. MASON (the general manager of the South Metropolitan Electric Tramways and Lighting Company) then presented his paper on "Standard Rules for Motormen and Conductors."

## RULES AND REGULATIONS FOR TRAMWAY EMPLOYEES.

BY A. V. MASON, M.I.E.E.

*(General Manager, South Metropolitan Electric Tramways and Lighting Company, Limited).*

This can hardly be called a paper in the proper sense of the word, for it is really only an explanation of the rules and regulations which have just been published by this Association. It was felt that some member of the Special Committee might with advantage explain the "whys" and "wherefores" of the rules as they have been presented, and that this should be done before they are made active use of by any tramway undertaking; it was also felt that the Congress afforded an excellent



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opportunity for doing this, as not only is it an interesting subject for discussion amongst tramway men, but the discussion might be of value to those intending to adopt these rules as a basis.

I would start by saying that during the latter part of 1912 a small sub-committee was formed, consisting of Mr. England as chairman, Mr. Edwardes, Mr. Barber, and myself. We held about a dozen meetings, and it was at the last of these that the suggestion was made that one of the members should read a paper on this subject at our next Congress, and the task fell to me. I mention these details because I feel that at one moment I may be speaking as a representative of the sub-committee, and the next moment in my personal capacity. In the latter case the other members may disclaim responsibility for some of my statements or opinions, and might say I was speaking without their authority, but as long as this is thoroughly understood, I can leave it at that.

The first step taken by the committee was to have a collection made of most of the rules and regulations now in force on the various tramway systems in the United Kingdom. This rough collection was then presented to the sub-committee as a sort of skeleton whereon to base their future operations. This skeleton had not by any means a "bony" appearance, and it was found upon consideration that, speaking generally, the rules were unduly long, in fact suffered somewhat from verbosity; they also often contained explanations tending to confuse, and in many cases there were needless repetition and duplication. After much discussion, the sub-commitee decided that no rule should be included which could not be reasonably enforced, and they were also of opinion that no threats or penalties should be included. All references to inspectors, timekeepers, and linesmen were omitted, as the committee considered that rules to inspectors should be for the private use of each undertaking and not for general publication. In regard to linesmen, it was also felt that no standard rules would apply, as each undertaking would have to be governed by local conditions.

Mr. A. V. Mason.

Having thus eliminated a substantial portion of the original matter, they decided to subdivide the new rules into three sections: (1) Rules applicable to both motormen and conductors. (2) Rules for motormen only. (3) Rules for conductors only. These are preceded by alternate forms of agreement, from which a selection can be made to suit the respective undertakings. The rules are followed by forms of instructions of "How to Deal with Accidents," "Offenders of By-Laws," "Faulty Cars, Overhead," etc. I would now submit the suggested standard form, and trust that members in criticising it will take the foregoing remarks into consideration. I will proceed to deal briefly with the details.

### AGREEMENT FORM.

Some form of agreement, whether a long one embodying many of the rules of the conditions of service, or a short one, I leave to the choice of the members, but some form of signed agreement is necessary in order to comply with the provisions of the Truck Acts. In this connection it may be of interest to our members to refer them to a letter written to the committee by our hon. solicitor, Mr. William Morris. This letter will be found in the appendix [page 36]. It will be noticed, that according to the advice contained in that letter, there should be a *written* agreement with the employee, which the latter should sign in order to make the proposed deductions legal. With reference to Rule 18, the committee deleted the words objected to, viz., "or in case of collision where injury has been done." The original skeleton taken from the various rule books was found to contain much contradictory matter, rules were duplicated, confusing, etc., so that a draft of every possible rule to be made or to be thought of was compiled and then cut out, fought over, separated or combined in the form now presented, with the result that the sub-committee have submitted what they consider may be regarded as a standard form. The rules as submitted are based on the understanding that we are dealing only with the motormen and conductors, or, in other words, with the "platform staff," and that the persons to whom they shall apply are already members of a tramway staff, and not applicants. Here, I might reiterate that the rules are for employees and not for applicants, but I will admit that, before a person can be reasonably asked to sign either the agreement form or the conditions of service, he should have some rough idea of the rules and regulations he agrees to carry out, so that really a standard application form might have been profitably added thereto. In dealing with applicants there seems to be some diversity of opinion. I personally consider that every man taken on as a conductor should eventually qualify as a motorman, and should be prepared to qualify in a given period, or make way for some one who will. Again, for this a height standard is necessary, but this seems to be hard to enforce in some parts of the country. In view of the increase of speeds of all vehicles, motormen should not only pass a medical examination on joining the undertaking, but should also be prepared to be re-examined periodically, especially for eyesight. Some undertakings are not content with taking up references, but ask for monetary deposits and sureties as well; but I do not consider these to be reasonable requests.

### GENERAL RULES.

These rules apply to both conductors and motormen, and I do not know that I have much comment to make thereon. The first dozen or so certainly seem to contradict the committee's assertion that brevity has been aimed at; but as these undoubtedly deal more or less with legal matters, some legal mind has framed them, and the committee therefore, it goes without saying, adopted them nearly as they stood. Many have been added, and they certainly seem to cover most matters, and I submit that they do not contain any conditions which are either unreasonable to ask for, or which the employee cannot reasonably accept. In the matter of discipline it might have been considered advisable to underline certain offences as being liable to instant dismissal, such as issuing tickets fraudulently, insubordination, intoxication, or entering a public-house when on duty; but the committee felt that these matters had better be left, with others not so important, under a general clause at the manager's discretion. In the matter of reports by inspectors, there appear to be various methods of dealing with this matter all over the country, but I think that in each instance, an inspector when reporting any employee for breach of regulation, should inform him of the fact at the moment, or at any rate as soon after as possible if the car passes him. I always insist upon this, and then send the offender a note for a written explanation, which is filed in his record. This saves personal interviews, and a man's record of excuses tells its own story.

### RULES FOR MOTORMEN.

It is assumed that the employee has passed his school and knows not only how to drive the car proficiently, but that he is also acquainted with all the details of the car and its equipment. Nearly all the rule books contained pages of details and diagrams in regard to equipments, controllers, etc., all of which the committee considered to be unnecessary at the present day; not in any spirit of criticism as to the rules themselves, but simply because the industry is now no longer in its infancy, but rather in its adolescence (or "senile decay," *vide* the "Commercial Motor"), and they considered that this information was no longer needed; they therefore omitted as much as possible. On the other hand, the committee in many places came perilously near the border line of technical instruction or school matters, but it was felt that many instructions should be constantly before the employee all through his career, especially as regards brakes, faulty cars, and other matters that would likely to be to the danger of the general public or of the service as a whole. These details will have to be enlarged and added to by undertakings which have special brakes or equipments, intricate cross-overs, routes, or termini. Another matter not touched upon by the committee is the subject of "meters." As far as a general rule is concerned, economy in driving a car must be achieved, and each local undertaking must add its own method of achieving it, as well as other matters of local importance.

### RULES FOR CONDUCTORS.

The same remarks in regard to the school apply in the case of conductors, but the committee felt that in the matter of tickets and cash, more specific instructions should be before the staff at all times. Members must not think for one moment that the committee expect the details as given to be made the general practice all over the country, but they do think that they meet the average conditions, and accordingly each local undertaking should amend the rules whilst retaining the system. An important item under this heading which might be advantageously discussed, even if rather outside the pale of this paper, is the advantage or otherwise of bell punches. I am aware that in some cases as many as 15 to 18 various forms of tickets are in daily use, and it is a questionable point whether or not too much time is not spent by the conductor on way-bills. The public are every day obtaining greater facilities in the shape of through bookings on other lines, to music halls, piers, picture palaces, etc.; and transfer returns make the punch register, to a large extent, useless. It has been claimed by some managers that a good inspector can satisfactorily check a car without the tickets being indentured at intermediate stages.

### SPECIAL FACILITIES.

Standard rules for transfers, returns, workmen's, school children, etc., have not been included. These seem to vary as much in practice as to charges and systems as those in the kindred branch of electric

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lighting. Looking at the various systems in practice and the absolute lack of uniformity in practice, the committee decided discreetly to leave these subjects alone. I would give a few details, as they would lead to very interesting discussion and, may be, standardisation at some future time. Local conditions, I know, govern most cases, but not to this extent.

### TRANSFERS.

Those in most common use are: (*a*) A transfer ticket which is only given to passengers demanding transfer facilities, an exchange ticket being given on the second car. (*b*) A transfer ticket with over-print letter denoting day of issue, with exchange. (*c*) An ordinary ticket with transfer section. No exchange—the second conductor tearing off and keeping the "ordinary" portion. (*d*) A transfer ticket (which is given with ordinary ticket), clipped denoting day, hour, and minute when issued. (*e*) A transfer ticket built in two halves, with a place for the first conductor to punch a letter denoting the day issued, and the second conductor punches out the hour and tears off the top half to balance the punch register. I will not attempt to discuss the "pros" and "cons," except to mention that all transfers seem fated to create abuse either by conductor or passenger, and all seem to be issued on the understanding that they must be used the same day and at once and are not interchangeable; but the question of trying to prevent abuse means complication of tickets and extra office work, and the cure is often worse than the disease. Systems that have tickets without face value, such as ordinary exchanges, are especially bad and lend themselves to "trafficking" and irregular usage.

### RETURN TICKETS.

The same remarks apply, to a great extent, to these facilities and tickets, and the same difference in practice exists. Returns are doubtless becoming more popular, especially where competition exists, and more "standard" forms should be possible.

### WORKMEN.

Privileges to workmen vary very much according to the district. Practice, however, again varies to a large extent. Many undertakings carry anyone on any car during "workmen's hours," and others again specify that a workman must comply with the meaning of the Act; others carry workmen only on cars marked "workmen." Here local conditions are important, for it is obvious that in manufacturing towns the same rules cannot apply which apply to London suburbs. I once tried an interesting experiment of issuing a weekly ticket at the rate of 10d. per week for 12 rides (2d. ordinary fare), or to and from work once a day. The object was to try to persuade the workmen to ride, wet or fine, and to pay for the tickets on pay day, when they are in possession of cash. The experiment was not successful—curious, for it should appeal—on paper!

### SCHOOL CHILDREN.

The system of carrying children to and from school at reduced rates is becoming more or less universal on many systems. Here we get a weekly ticket at a fixed price—or again a ticket capable of being used for so many days—or the children are simply charged half ordinary fares without special tickets. The system that appears to be most satisfactory is to issue a yearly identification card, which can be obtained at the office or school at a small nominal fee, and which, on production, enables the holder to ride half-price, an ordinary ticket being issued—1d. each way being the lowest fare. Of course it will be argued that this does not cover all conditions; the Board School child generally is well within walking distance and need not be provided for; but without doubt the secondary and private schools bring grist to the mill even at reduced fares, and help to stimulate the wish to ride early and often. This is a lesson well learnt from the tramway aspect.

The age limit of school children varies over the country, and anomalies often arise, as one does not grant these facilities to shop apprentices, shop girls, and pupil school teachers, who do not come under the definition of "workmen," and who are often too late for these facilities; but the electric lighting tariff factor of "expediency" can be brought into play: just as we tramway men often have to pay twice the price for driving our cars that we do for heating our rooms (if we start heating our cars electrically a very curious anomaly will arise), and I do not see why these apprentices should not be included in the reduced fares; the railways now cater for and obtain them.

### TOKENS, DISCOUNT, OR STRIP TICKETS.

These "facility" tickets have not been adopted to any extent in this country, so a standard rule has not been framed. Tokens are doubtless a convenience to tradesmen, and the strip or discount ticket presents fascinations and gives a facility for the granting of rebates for special traffics readily and without having to make sacrifices, simply by the addition of one, two, or more tickets on the strip; but the ease with which conductors can "traffic" in these has been the obstacle to their popularity. In Canada the box collecting system saves this to a large extent, and there the whole population travels by ticket at differential rates not only for workmen, school children, etc, but for different hours. I mention this because I often wonder whether generally we are not too "hide bound" and too fond of playing for safety, afraid of abuse by the public, or trafficking by the conductors; and yet perhaps with a little more elasticity in our ticket system a net increased revenue would be earned. These remarks do not apply so much to the manufacturing districts as to the residential, or where there is competition.

### PARCELS OR PERSONAL LUGGAGE.

This traffic is also subject to great variations. Some undertakings carry all parcels free; some charge 1d., others 2d. for any distance; others again charge the same fare as for passengers. Push-carts are generally carried free, and the push-cart of to-day is becoming a young perambulator. Dogs are also a bone of contention, and the meaning of "personal luggage" varies considerably. Some standard practice is desirable; it is also desirable to issue a special ticket stating that the parcel is carried at the owner's risk (if this can be legally enforced). In my personal opinion I do not see why a passenger should not be charged a nominal sum for every parcel that is carried on either platform, and only such parcels carried free of charge as can be carried on the lap and do not cause inconvenience to other passengers.

### BELL SIGNALS.

A good deal of diversity is shown in practice. Some systems adopt a signal of two bells to start, and of one bell to stop; others reverse the process. Personally, I should have thought it better practice to have one bell to stop and only the professional double ring of the experienced conductor for starting. On my undertaking we have the double bell to stop, owing to through running, and I find that a double-double bell is most useful as a signal for an immediate stop, but not to be mistaken for an emergency one. It is most annoying in the event of a conductor missing a passenger not to be able to stop the car promptly; the motorman very often thinks the ordinary bell denotes the next stopping place.

### THROUGH RUNNING.

In the case of "through running," local conditions again govern matters to a considerable extent, and "through running" arrangements vary to an even greater extent than transfers. At the same time the details are matters governed by policy rather than by discipline.

### TOOLS.

The question of tools should be included in the chapter on motormen, and this also brings out many different practices. Some managers have tools locked up in a glass case; others supply a complete kit of tools, with hammers, jacks, gloves, etc. Personally, I believe the most satisfactory practice is to have a board fitted with a feeder box key, pair of pliers, Stilson wrench, screwdriver, piece of rubber insertion, on a board, and a hand-lamp, fitted with night-light in place of oil (the lamp is hardly ever used, and oil always leaks), which is taken out by the motorman who first takes the car out of the shed; he passes it on to his relief man, who in his turn hands it to the inspector on completion of his duty. All lost tools must be paid for at cost price.

### GENERAL.

These notes complete the rules, and instructions are appended on the subject of "How to Deal with Accidents," "Faulty Cars," etc., which are all especially open to discussion. The chapter dealing with "accidents" is the fullest. Too much stress cannot be laid upon the absolute necessity of obtaining a correct version of the occurrence, irrespective of whether members of the staff are to blame or not. Accidents are bound to occur, and there is nothing more annoying than for a manager to be misled by an employee anxious to put the best side of his story forward. It is also of the greatest importance to obtain the names and addresses of witnesses, whether they actually saw the accident or not; and this cannot be too fully impressed upon the staff. "How to Deal with Offenders under the By-Laws" is also useful for the staff. Offenders in my experience, will generally give names and addresses, but it is often desirable for an inspector to follow the offender in order to check these. Obstruction by vehicles is the commonest of these offences, and the most difficult for which to obtain satisfactory redress. Short instructions are desirable of how to deal with the ordinary faults which may dislocate services: "faulty cars" or "faulty overhead." There is a great divergence of opinion amongst tramway managers as to exactly what they expect under these circumstances. Personally, I think that every motorman should be capable of repairing or adjusting, at least, simple faults—at the termini, of course, if possible, in order to obviate having needlessly to shed the car and to prevent upsetting the traffic; or he should be capable of satisfactorily cutting any faulty overhead section dead. It may be argued that these are details for the school, but they are simply added as "refreshers," and very useful as such. They can, of course, be elaborated or cut out altogether as the individual manager thinks fit.

### CONCLUSION.

In conclusion, it only remains for me to ask the indulgence of the members of the Association in the discussion which is to follow, on behalf of my fellow-members of the sub-committee and of myself. And I would take this occasion of thanking the various members and others on behalf of the committee for copies of their rule books. A large amount of attention has been paid to the subject, and whilst the committee realise, in submitting these rules and regulations to the Association as a standard, that they must largely be governed by local conditions, it is hoped that they may be of some small use to the industry from the employers' as well as from the employees' point of view.

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## APPENDIX.

COPY OF LETTER FROM MR. W. MORRIS, DATED FEBRUARY 17, 1913.

Rules 12 and 14*d* may conveniently be considered together.

"There is a distinction to be made between 'motormen' and 'conductors.' A motor omnibus driver has been held, in the case of *Smith v. Associated Omnibus Company* (Law Reports, [1907] 1 K. B. p. 916), to be a 'workman' within section 10 of the Employees and Workmen Act, 1875. It is assumed, and I think rightly, that he is also a 'workman' within the meaning of the Truck Acts, 1887 and 1896. The deductions contemplated by Rule 12 for some of the matters mentioned therein, as for instance 'disobedience to or disregard for any of the by-laws and regulations' would be illegal under these Acts.

"The deductions for damage or injury to uniform would not be illegal under the Truck Acts if the provisions of these Acts relating to such deductions were strictly complied with, *e.g.*, contracts in writing (not verbal) authorising such deductions must be signed by the employee, and particulars of the acts, omissions or things for which the deduction is made and the amount thereof (which must be fair and reasonable) must be given in writing by the employer to the employee.

"A conductor has been held, in the case of *Morgan v. London General Omnibus Company* (Law Reports, [1884] 13 Q. B. D., p. 833), not to be a workman, and the provisions of the Truck Acts therefore may be considered as not applying to 'conductors.' In order, however, to be valid, the regulations, even in the case of conductors, must be incorporated in a written contract signed by the conductor, and the conductor must be given an opportunity of being heard by the general manager before he exercises his discretion (see the decision of the Court of Appeal in *Armstrong v. South London Tramways Company*, (1890) 65 Law Times (N. S.) 96).

"With reference to Regulation No. 18, viz.:

> 'No legal action, whether criminal or civil, arising out of service matters is to be undertaken without the permission of the general manager.
>
> It is strictly forbidden to detain or give into charge any person except for the following reasons: "Wilful destruction of the company's property, or, in case of collision, where injury has been done. In case of dispute with a passenger about non-payment of a fare, or value of coin received, employees must act with caution. If necessary, the name and address must be obtained, but on no account must the passenger be detained, or resort had to a police charge."'

"The first paragraph seems to me to be rather too wide.

"With regard to the second paragraph I have some doubt as to the exception in the first sentence contained in the words 'or in case of collision where injury has been done,' as it seems to imply that the conductor can give in charge in such a case, and I should doubt the legality of this."

## DISCUSSION ON MR. MASON'S PAPER.

Mr. A. W. A. CHIVERS, of the British Electric Traction Company, said most of the delegates would remember that in the early part of the year they were nearly in the throes of a railway strike, brought about very largely by reason of the fact that one of the employees of the Midland Railway Company refused to break one of the company's rules. It appeared that there was an understanding between the company and the employees whereby, under certain circumstances, the railway men—he believed it was the drivers in this case—were enabled to break certain rules when requested to do so by those in authority. The rules as printed said that no train should take more than a certain number of wagons, but when these wagons were empty a larger number could be taken if the brake power of the engine would enable it to be done with safety. In this instance an inspector authorised the train man to take more than was allowed by the rules, and the train man refused, with the result that he was suspended. The railway employees' union took the matter up, and said it was not fair to suspend him when he was conforming strictly to the letter of the rules. There were in the tramway rules which had been printed certain matters that might very advantageously be deviated from in particular circumstances, and he thought that if some provision were made in the rules, whereby under such circumstances a driver or conductor be allowed to deviate from the strict letter of the rules on receiving special instructions from those in authority, it would be of great benefit and be conducive to the smooth working of the undertakings. It would give a little more flexibility, and that was desirable.

Mr. C. D. STANLEY (New St. Helens and District Tramways Company), referring to offences in tramcars, said that most offenders generally gave names and addresses, but in 19 cases out of 20 they were false. What instructions could be given to their men as to when and where not to detain a passenger if they felt that the name and address given was false. There was a difficulty in instructing a conductor in a case like that, because if they went too far they might land the company in a difficulty.

Mr. MASON, in reply, said the committee thought that where deviation from the rules was considered necessary, the several officers on the road would take the responsibility. Regarding the detention of offenders on cars, if it was thought the name and address were wrong, and unless the offence was a serious one, they generally tried to get an inspector to follow the offender and see where he lived. The magistrates generally came down harder on a man who gave a wrong name and address.

The Hon. ARTHUR STANLEY thanked Mr. Mason for the way in which he had brought forward the model rules, and also thanked the committee for the time and trouble they had taken over them. As this was the close of their business, he proceeded, they would wish their last act to be to place on record an expression of their appreciation and their very hearty gratitude to the Mayor and Corporation of Blackpool, to the Corporation Tramways Committee, and to the two other tramway companies for the very kind way in which they had entertained them. There had been no opportunity of thanking the Lytham and St. Annes Tramway Company on the previous day, so he did so that morning. They had not only had a most enjoyable time, and an experience that they would long to repeat, but he honestly believed the Conference would have been one of the most important—if not the most important—they had had, and that lasting and good results would come of it.

Mr. H. ENGLAND seconded the vote of thanks, and said that Mr. de Turckheim and he had been jointly responsible for the local arrangements, and they had had to see the Mayor, Mr. Furness, Mr. Cameron, and Mr. Laing on several occasions. These gentlemen deserved very hearty thanks for the way in which they had responded to their call. The arrangements could not have been better carried out. They were delighted with the success of the Conference, and they felt they were going on better year by year. (Applause.)

The MAYOR briefly acknowledged the vote of thanks. He felt sure that the Corporation would give them another invitation to come to Blackpool, and he hoped he would be present to assist in giving them a hearty greeting.

## REPORT OF THE LIGHT RAILWAY COMMISSIONERS.

The annual report by the Light Railway Commissioners of their proceedings up to December 31, 1912, and the report of the proceedings of the Board of Trade, under the above-mentioned Act, are as appended: "On December 31, 1911, three Orders were before the Board of Trade awaiting confirmation; these were confirmed in the year 1912. During 1912, nine fresh Orders were submitted to the Board of Trade by the Light Railway Commissioners for confirmation. The Board considered each Order with special reference to the points mentioned in section 9 of the Act, and made such amendments in the Orders as were deemed necessary. Six of the Orders submitted during 1912 have been confirmed, making, with those above referred to, a total number of nine Orders confirmed by the Board in the course of the year; and the remaining Orders are still under consideration. In no case did the Board refuse to confirm an Order. The Orders confirmed in 1912 authorise about 12 miles of line, at an estimated cost of £162,455. A list of the Orders confirmed by the Board of Trade in the past year, with the date of confirmation and the mileage authorised, is appended to the report in continuation of lists in previous reports. Since the date of the last report, the Treasury have conditionally promised a loan, under section 5 of the Act, not exceeding £17,000, towards the construction of a proposed light railway in the County of York from Richmond to Reeth (Swaledale Light Railway). The Light Railways Act, 1912, amending the Act of 1896 in several respects, received the Royal Assent on December 13 last. Amongst other provisions it increases from £250,000 to £750,000 the amount placed at the disposal of the Treasury under the Act of 1896 for special advances in aid of light railways, and also extends the powers of the Commissioners for a further period of five years."

## TROLLEY WIRE COPYRIGHT ACTION.

At the Lancashire Chancery Court, Liverpool, on June 24-26, the British Insulated and Helsby Cables, Limited, claimed damages against the London Electric Wire Company and Smiths, Limited, of Anaconda Works, Salford, for an alleged infringement of their registered designs for overhead trolley wire for electric tramways, and they asked for an injunction to restrain the defendants from further infringements of their copyright.

Evidence was called for the plaintiffs to the effect that the defendants sold, or offered for sale, trolley wire to the Corporations of Halifax and Wallasey which had been made in accordance with, or was an obvious or fraudulent imitation of, the plaintiffs' designs. One of the representatives of the plaintiff company stated that 35 Corporations in this country had been supplied with plaintiffs' wires, and that they had also supplied South Africa and Australia in large quantities.

Mr. W. M. Mordey, electrical engineer, Westminster, said in his opinion the wires supplied by the defendant company were an infringement on the plaintiffs' designs. The wires of the plaintiff company surmounted in the fullest degree the difficulties previously experienced in relation to the attachment of the trolley wires to their overhead support.

Witnesses were called for the defendants, who contended that the designs which the plaintiffs claim as their copyright were anticipated, and that they were neither novel nor original. Judgment was reserved.

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## RATING OF TRAMWAYS.

JUDGMENT RESERVED IN APPEAL TO HOUSE OF LORDS.

In the House of Lords on June 26, before the Lord Chancellor and Lords Shaw and Moulton, arguments in an appeal by the Urban District Council of Tottenham against an order of the Court of Appeal in favour of the Metropolitan Electric Tramways, Ltd., were concluded.

The respondent company are the occupiers of and work as one continuous system certain tramways and light railways in the North of London, all of which system was constructed along public streets, and in respect of which statutory powers had been obtained. In the present case, part of the company's present system originally was constructed under tramway powers. The Council took the point that as to that portion, although now electrified, the partial exemption given to "light railways" did not apply, and they claimed the full rate, namely, £495, from the company. The company paid £123, one-fourth part, but refused to pay the other three-fourths, £371. The Justices were of opinion that the old tramway portions of the company's system—as to the new portion there was no dispute—was not a "railway" within the meaning of the section in the Public Health Act, 1875, and made an order on the company to pay the balance of the rate.

The Divisional Court upheld the decision of the Justices, but the Court of Appeal decided that the tramway portion came also within the exception, and that the company were only liable to pay, as before one-fourth of the assessment.

Mr. Macmorran, K.C., Mr. W. Ryde, K.C., and Mr. W. H. C. Sharp appeared in support of the appeal; and Mr. Danckwerts, K.C., and Mr. C. C. Hutchinson, K.C., were for the respondent company

Mr. MACMORRAN said that the tramway was constructed under Parliamentary powers obtained for its construction as a tramway and not as a light railway. The true test as to whether it was a tramway or a light railway, as pointed out in the Swansea case, was what powers did the private Acts confer on the undertakers? When power was obtained to construct these tramways, they were to be propelled by horse-power. In all of these Acts of the company the lines were dealt with as tramway lines. They purported to incorporate the Tramway Act; there was no mention in any of them of the Railway Clauses Consolidation Act. Later, horse-power was replaced by electrical traction, but it was still a tramway. Light railways were constructed under Acts of Parliament which were differently drawn to Acts of Parliament for the construction of tramways. In the present case their Lordships would have to consider the County of Middlesex Light Railway Orders of 1901 and 1903, both made and confirmed under the Light Railways Act, 1896. His submission was that this case was governed by the Wakefield case, 1908, A.C. 293. That was a decision as to light railways, and it was held that by virtue of the Light Railways Act, 1896, the light railway was a railway to which Sec. 211 (1) (B) of the Public Health Act, 1875, applied. The decision in that case went on the ground that the undertaking was not constructed originally as a tramway, and was, therefore, a light railway, and the House of Lords adopted the view expressed by the Court of Appeal. The Swansea case which was then decided it was reported, 1892—on which the Divisional Court acted, presumably was brought to the notice of this House when the Wakefield case was argued, and if they had thought it not good law they would have overruled it.

The LORD CHANCELLOR: You invite us to hold that the Swansea case governs this case, and that the Court of Appeal were wrong in overruling it, and following the case of Thornton Urban District Council *v.* Blackpool and Fleetwood Tramways Co., decided in 1909?

Mr. MACMORRAN replied in the affirmative, and said that prior to 1904 respondents, in respect of the tramway, were assessed to the general rate of the district as a railway was assessed under Sec. 211 (1) (B) of the Act of 1875—namely, in the proportion of one-fourth part only of the net annual value; they then came to the conclusion that they were tramways, and therefore not entitled to the reduction.

Mr. DANCKWERTS, K.C., for respondents, said there was nothing mysterious in the word "railway." Rails fixed to sleepers on the ground were as much a railway if used for carriages to pass over whether the undertaking was promoted under a private Bill for a tramway or a light railway. The important point was that the railway was constructed on the land under powers of an Act of Parliament. That distinguished it from a railway put down by a company, for example, to link up their colliery with a railway company's sidings. The tramways and light railways described in the case were identical, and their user and working were identical and as one system, and each was used under statutory powers, and it was an unreasonable conclusion to hold that the light railways were land used only as a railway constructed under statute, while the tramway was not. In all the early statutes a railway was always spoken of as a "railway or tram road." The judgments in the Swansea case, the counsel submitted, were not in accordance with various other cases which he cited. The true view of the matter was that taken by this House in the Thornton case, and applying that principle here, the tramway was a "railway" within the meaning of Sec. 211 of the Public Health Act.

The Lord Chancellor reserved the decision.

## PRIVATE BILL LEGISLATION.

MORLEY CORPORATION RAILLESS TRACTION.—During the hearing of their bill, which was opposed by the West Riding County Council, it was announced that the Corporation had agreed to pay three-eighths of a penny per car-mile to the cost of maintaining the roads, and a clause to this effect was inserted in the bill. It is proposed to run cars through Drighlington, Gildersome, Morley, and East and West Ardsley. Leeds Corporation are to work the system, and will pay a rent sufficient to meet the interest on capital expended and the sinking fund.

LONDON COUNTY COUNCIL TRAMWAYS.—Sir Ivor Herbert's Committee of the House of Commons, on June 17, granted the clause in the London County Council's bill to empower the tramways department to carry in the cars a number of standing persons, not exceeding one-third of the inside passengers, on the following occasions: Inclement weather; Sunday; Bank Holiday; some other public holiday; Saturday after 12 noon; what the Commissioner of Police agrees is "a special occasion." On June 19 the Committee granted a clause enabling the Council to work the London United Tramways in Askew Road and Paddenswick Road, which are within the County Council boundary at Acton. The committee added a condition that the Council should concede to the company the right to run over the route within the county boundary, upon terms to be agreed on or fixed by arbitration, in order to secure the continuance of through running for the convenience of passengers to Shepherd's Bush and Hammersmith.

WEST BROMWICH CORPORATION RAILLESS TRACTION.—A decision was arrived on June 4 by Mr. E. Gardner's Select Committee of the House of Commons who heard evidence for and against this bill. The estimate for the proposed new trolley vehicles and equipment was £18,197, for motor omnibuses £8,000, and for the purchase of land and street improvements £15,000. The Corporation asked for power to run motor omnibuses within the borough and without the borough by agreement with the local authorities through whose district the omnibuses were run. The Committee granted the powers asked for in respect of trolley cars and motor omnibuses, except between Greets Green and Great Bridge, this route not to be undertaken without the consent of the Tramway Company during the remainder of their lease. To save the Council from having to promote another bill the Walsall route would be dealt with on the same terms. In regard to the clause which would give the Corporation power to apply to the Board of Trade for a provisional order to sanction new routes, the Committee decided that this power should be granted only in respect to converting omnibus routes into trackless routes.

WESTERN VALLEYS (MON.) RAILLESS TRACTION.—This bill, which seeks powers to provide means of locomotion in a mining district in Monmouthshire, was considered by a Committee of the House of Commons on June 23-26, presided over by Mr. Clancy. For the promoters, Mr. Knox stated that the capital powers would allow the company to raise £60,000 in shares and £20,000 in debentures. They asked for power to construct a generating station, leaving it open to them afterwards to arrange with the local authority if they could agree on a reasonable price. Mr. J. B. Hamilton and Mr. G. Conaty were the chief witnesses called in support of the bill, the last-named stating that the roads were too narrow for tramways and too steep for motor omnibuses. They were in good condition, and quite suitable for railless trolley traction. The opposition came from local authorities, who asked for contributions towards road reconstruction and maintenance. The promoters offered a farthing per car-mile after first refusing to make any offer, and the Committee passed the preamble subject to the inclusion of a clause that the charge for road maintenance should be three-eighths of a penny per mile, excluding workmen's cars, and that one-third of the cost of reconstruction should be paid in urban districts, such one-third not to exceed £500.

MEXBOROUGH AND SWINTON RAILLESS TRACTION.—Between June 3 and 12 inclusive Sir Ivon Herbert's Committee of the House of Commons sat on several occasions to hear the evidence relating to the railless trolley bill promoted by the Mexborough and Swinton Tramways Company. Mr. E. H. Lloyd, K.C., for the company, stated that it was proposed to equip several routes in mining districts with a total mileage of 6¼ miles. Borrowing powers to the extent of £35,000 were sought. The railways could not cater for the local traffic, because the stations were miles from the centres of population. Alderman D. L. Winter, Rotherham, a director of the company, said that in his experience trolley vehicles possessed great advantages over tramways. The present means of communication between the mining districts were inadequate. The Committee were not satisfied that the route from Swinton to West Melton was planned to meet the needs of the district, and they deleted that portion of the bill. They approved the two other routes, and suggested that a route should be included from Ardwick-upon-Dearne, northward to Goldthorpe. They decided that the promoters should pay one-third of the cost of adapting the roads to trolley vehicle traffic, such sum not to exceed £350 per mile, and thereafter three-eighths of a penny per car-mile for road maintenance.

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THE
# Tramway and Railway World

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**Cost of Road Maintenance.**

It was made increasingly clear from the discussion at the Blackpool Conference of the Tramways and Light Railways Association, to which much of this issue is devoted, that the time is now ripe for a concerted movement in this country for putting road and street maintenance on a more equitable footing. The Hon. Arthur Stanley, who is interested both in automobile vehicles and in tramways, voiced what is fast becoming the general opinion. As we have frequently discussed the main facts, we need do little more here than mention them—namely, that tramway traffic which does not wear out the roads at all is burdened with heavy charges for road maintenance and for rates on the tracks, while motor omnibuses and other heavy motor vehicles and trackless trolley cars, which do wear out the roads, contribute nothing to maintenance and pay no rates in respect of the use of the roads. The petrol tax does not go to maintenance but to improvements and new roads in districts where little of the tax accrues. On the one hand we have road authorities, both urban and rural, groaning under the expenditure to which they are put for road maintenance required owing to automobile traffic; on the other hand we have tramway authorities protesting against the increasing cost of maintaining the parts of the roads for which they are responsible and to the wear of which they do not contribute. The recent Road Congress held in London—in which tramway interests had next to no representation—gave evidence of international opinion in favour of reform. Among the resolutions which were passed were two in favour of maintenance of main trunk roads being borne out of national revenue and in favour of vehicles being specially taxed, which on account of weight or speed cause special damage to roads.

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Parliamentary Committees which have considered during this session bills authorising trackless trolleys and motor omnibuses have recognised the fact that general legislation is necessary, and have refrained from imposing specific terms on promoters. They have, however, confirmed compromise agreements either for payments of three-eighths of a penny per mile run towards maintenance, or for arbitration to settle amounts. Such piecemeal arrangements are not satisfactory in themselves and, moreover, they cannot be applied to cases where companies run motor omnibuses. A company requires no Parliamentary powers to carry on that work. The present hardship to road and tramway authorities in London is beginning to spread over the country as the use of trackless cars and motor omnibuses extends. Thus we may expect to find road authorities and the two Tramway Associations making common cause. It seems rather doubtful whether any help can be expected from any of the automobile interests, though the suggestion that the Roads Improvement Association might be approached is worth adopting. In any event the time has come for a fully-developed agitation which should have for its two main features the abolition of the charge for road maintenance on tramway undertakings and the placing of the burden on those who chiefly wear out the roads—namely, automobile and trackless trolley vehicles, especially of the heavier classes. The burden should take the form of a tax proportional to mileage run, and the money should be specifically ear-marked for road maintenance. In this agitation the road and

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the tramway authorities may expect to get the support of the general public, as the ratepayers, both in town and country, are suffering severely from the charges for road repairs—charges which, compared with a few years ago, are enormous. It is only by combined influence being brought to bear on Parliament that anything can be done. Long experience has shown that strong pressure alone can induce Parliament to give time for practical reforms which have no political taint about them. All the parties concerned in this matter must therefore take their coats off if anything is to be done.

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**Trail Cars in London.**

Provincial tramway authorities who may be considering the question of employing trail cars in the carrying of their rush-hour traffic should find the path for acquiring powers made easier by the experience of the London County Council. Several undertakings have had the matter under consideration since, in our issues of April, 1912, we published an extensive range of opinions of foreign tramway managers and others in support of the application which the Council made to Parliament for powers in June of last year. A year before that period the Board of Trade had allowed an experimental service to be carried on over a route of heavy traffic from Euston to Hampstead, and although it proved very successful and there were no complaints, the police triumphed in their unreasoning opposition by the expedient of refusing to license the trailers. Notwithstanding that four organisations—police, private motorists, commercial motor owners, and the omnibus companies—opposed the Council's application to Parliament, the case was so strongly supported that the House of Commons Committee had no hesitation in bestowing powers, subject to regulations to be made by the Board of Trade. An important factor in securing the clause was an experimental trip which the Committee made in a car and trailer from Westminster Bridge to the south end of Blackfriars Bridge, but the whole case was presented in a manner that could not fail to secure success for the public interest against biassed opposition and the bureaucrats of Scotland Yard who seek to usurp the functions of the engineers of the Board of Trade. The police opposition was countered by the evidence of a Paris tramway witness, that the police in that city were in favour of trail cars, whilst the Brussels tramway manager was able to announce that experimental running had converted the police there to an opinion in favour of this means of remedying congestion. Another circumstance which should not be lost sight of, in view of trailer applications next year by Birmingham and other cities, relates to a controversy concerning congestion of traffic in the centre of Manchester a few years ago. There the owners of other vehicles sought to create trouble for the Tramways Committee because of the disregard paid at busy crossings to the regulation which requires an interval of ten yards between the cars. It was recognised, however, by the authorities that the closer together cars can be passed over a crossing the sooner will the space be cleared to permit vehicles to come from another direction.

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Regard should also be paid by the younger generation of managers to the evidence given in support of the London application by Mr. Stephen Sellon, who, as representing the Tramways and Light Railways Association, reminded the Committee that trailers were used in the days of steam cars, and that the working both then and subsequently showed that they reduced the liability to accident by 50 per cent. Some recompense for the experiments and delay which have had to be faced in the introduction of the trail car to London, is to be found in the improvements which Mr. Fell and the Board of Trade have effected. As the result of his experience of the Euston-Hampstead experiment, the chief officer of tramways has adopted a telescopic guard between the leading and trailing car in place of the gate arrangement at first utilised. If the rear car is also a motor car, both are to be fitted with electro-magnetic brakes, so that if the cars separated the trailer stops dead by the brakes coming into operation. For trail cars without motors a special form of spring brake has been devised to produce instant stoppage. This spring attachment has long worked satisfactorily down the second steepest gradient in London, namely, Dog Kennel Hill, where the descent is 1 in 10·7. An improvement for which the chief inspecting officer of the Board of Trade is responsible, concerns the

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possibility of the automatic coupling on the tractor car interfering with the satisfactory operation of lifeguards when the car is working independently of the trailer. A new set of couplers, devised by the manufacturers, has been tried, and appears to be quite satisfactory. Testimony should be borne to the excellent spirit which the Board of Trade are showing in their supervision of the three months' experiment which was entered into upon the Woolwich and Eltham overhead trolley route on March 17 last. The lines there, although well used by traffic at certain times, are not typical of London's busiest routes. In the ordinary course of things the Board had called for a report on the running, but they have agreed to a further three months' trial first. This is to take place on a conduit route between the Embankment and Tooting, this circular line carrying the heaviest traffic in London, and passing through the busiest traffic centre used by both tramcars and motor omnibuses.

**The Tramways Problem.**

Even the most enthusiastic advocate of tramways must realise that their future is not so rosy as it was but a short while ago. At one time they held the field, but their very success raised a host of competitors. The steel tyre on a steel rail has, however, been found harder to beat than was fondly hoped in some quarters. For smooth working tramways run the best railways very close, and when both the rolling stock and the permanent way are in first-class order they really form an ideal conveyance for comfort, noiselessness, and absence of noxious fumes. All tramway managers should take these facts to heart and should realise that the only way to secure the number of passengers they have had hitherto, and even to attract more and more of them, is not to spoil the ship for a ha'porth of tar. If efficiently maintained the very conditions essential to the forming of an ideal road act as advertisements, and, as all advertisements of a really good thing have been found to do, invariably and with mathematical certainty repay any maintenance expenditure in increased receipts. The question of corrugation is a crying one in this connection, for in spite of the oceans of ink and the floods of talk that have been spent on it, we seem to be no nearer a solution of the problem or a radical cure of the evil than we were the many years ago when the trouble first became acute. A roaring rail is always an insupportable nuisance. That noise of any kind is preventible is an accepted axiom in mechanics; moreover, a noisy machine is an imperfect one, and one that should not be tolerated in these days. Corrugations cannot be prevented, but they can be ground down before they cause a nuisance. Similarly wear and tear of working parts are unavoidable, but should be made good long before any loud rattling takes place. The very men who can design and work machines day in and day out for years on end with no appreciable noise whatever should surely be able to keep tramcars in perfect order—given the necessary funds. Tramway authorities might well take to heart what has been effected in the case of many motor vehicles, which are now practically silent workers; nor should they hug themselves with the complacent and erroneous idea that any of them are quite safe from competition. The power of public opinion is irresistible in the end, and if, in any town whatever, a tramway system becomes an intolerable nuisance by reason of bad construction or slack maintenance, that tramway system is bound, sooner or later, to be superseded by another mode of transportation. Corrugations are not the only sinners: brakes when violently applied or when used without judgment are almost as bad; for not only do they tear up the head of the rail and cause flats on the tyres with a terrible grinding noise, but they swing and toss passengers about, causing in some cases so much *malaise* that passengers naturally prefer other means of getting about. Of the little amenities on the part of employees which cost nothing and are so much appreciated we have written time and again; of the smart looking out for would-be passengers; of the collection of old tickets; and of the attention to the ventilation. These comparatively trifling matters all tell in favour of any tramway system that adopts them or any other means for adding to the comfort of their patrons and therefore to the number preferring the pleasanter mode of travel wherever competition exists; or who travel when otherwise they would not, attracted by the absence of irritating noise and other inconveniences.

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**Payment on Entry.**

No better proof of the advantages derived from passengers paying their fares on entry could be desired than is provided by the circumstance that Liverpool (one route), Leeds, Sheffield, and Bradford have made it a practice to take the fares of top-deck passengers as they board the platform at intermediate stopping places. This method has proved so successful on a few trial routes at Leeds that it has been extended over the whole of the tramways. Portsmouth is the latest place to follow suit, and the beneficial results of the innovation are so obvious that many other undertakings may be expected to engage in experiments. From the points of view of the P-A-Y-E Company and of the car crews these innovations are to be welcomed, for the experience gained on cars not possessing the more commodious and specially fitted entrance and departure platforms should in course of time result in a desire to try the effect of a properly equipped car. Only by this course will managers be able to avoid the complaints that the imitation system gives rise to. By adopting the system of specially coloured tickets the company have met the chief objection of varying fare stages which at the outset was urged against their scheme in this country, and the experiences of Gateshead with single-deck and of Leicester and Aberdeen with double-deck cars go to show that there is no foundation for the only other ground of criticism—the fear that payment on entry results in the blocking of traffic at busy stopping points. Indeed the contrary result follows, for almost by the time departing passengers have descended at the front the incoming people have paid their fares on the other platform. A gratifying outcome at Aberdeen is shown in the financial returns on the Woodside route, where the prepayment cars are running. The ninth week of their introduction gave a revenue increase of £19, while for the whole nine weeks the receipts were up by £246. The inference to be drawn from this is that missed fares and overriding are prevented.

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**A Suggestion for Hastings.**

The Hastings and District Electric Tramways Company is confronted by a peculiar problem which is the more interesting because it is in many respects unique. The Act of 1903, under which the tramways were constructed, requires the company to adopt self-propelled cars on the sea front or to work that part of the line by some other system than the overhead with which the remainder of the track is equipped. The Dolter system was accordingly installed in 1907 with the approval of the Corporation, and Hastings is now the only place where this method of supplying current from studs in the roadway remains in operation. It has been found here, as elsewhere, expensive and unsatisfactory. The Board of Trade ordered an inspection last year at the instigation of the Corporation, and reported to this effect, whereupon the company, after endeavouring to come to an agreement with the Corporation for the installation of the overhead system, applied to Parliament for powers to override their opposition. This was not, perhaps, the wisest course to pursue. Not only did the Corporation oppose, but the frontagers raised a fund and briefed counsel to fight the bill, with the result that a House of Lords' Committee decided the bill must not proceed. Meanwhile the Board of Trade advised the company that they proposed to forbid further employment of the Dolter system after next September the fifth. Some new method has consequently to be devised for drawing the cars along the sea front during the next three months. The slot system is impractical on account of the cost, also because the roadway is made on a foundation which does not admit of it, and any motive mechanism placed on the cars themselves would have to be carried idle over the whole distance to Bexhill and Cooden unless journeys were broken at either end of the sea front, which would be a grave inconvenience to the public. A comparatively light petrol motor coupled on to the tramcars when they reach the sea front would provide sufficient tractive power to draw them over it. It could then be detached, and the distance being short but few of such motors would be needed to deal with the whole traffic. The cost of supplementing every car with the means of self-propulsion would indeed be prohibitory, especially as the gauge is 3 ft. 6 in., and space is cramped as it is. Possibly, however, the improvements in accumulators referred to in our last issue might permit the cars to receive current from a storage battery carried on a trailer over the critical two miles.



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## PETROL-ELECTRIC CAR IN IRELAND.

In a paper on self-propelled cars for light railways, read by Mr. J. P Tierney before the Dublin section of the Institution of Electrical Engineers, the author described a car that he had designed for running over the lines of the Dublin United Tramways Company and the Dublin and Blessington Company, which is at present operated by steam locomotives. The car measured 40 ft. over the buffers, the body was of the centre-entrance type, the entrance for passengers being not exactly in the centre, but placed at a point one-third of the total length of the car from one end. At this entrance a doorway to the right led into the passenger compartment and a door to the left into a special compartment containing the plant. Also to the left was a straight incline staircase leading to the top deck. By this means space was economised, and it was possible to get the plant partly under the staircase. At each end of the car was a driver's compartment, with the necessary control apparatus. The passenger compartment, which seated 36 passengers, was divided into two classes, first and third: the top deck seated 69, leaving a total seating capacity of 105 passengers. One bogie truck was equipped with two 54-H.P. motors, capable of propelling the car with a 10-ton trailer at a speed of 25 miles per hour on the level, and a speed of from six to eight miles per hour on a grade of 1 in 25. On the Blessington line for a distance of three miles the grade averages 1 in 35, which in one place is as steep as 1 in 20. The power plant consisted of a 100-H.P. petrol engine, driving a 65-KW. direct-current compound-wound interpole dynamo. In addition there was a small petrol engine driving a vacuum exhauster for the vacuum brakes, and a small lighting generator for lighting the car. The engine was water-cooled, radiators being provided on the roof in front at one end, in the position usually occupied by the destination indicators. The car was also fitted with an ordinary trolley for running on the city lines. The control would be duplicate, the ordinary series-parallel controller for operating on the trolley section, and a controller on the shunt field of the dynamo for operating on the petrol set.

In his reply to the discussion Mr. Tierney referred to the petrol-electric car with the Thomas transmission system on the South African Railways, which was illustrated in the TRAMWAY AND RAILWAY WORLD of February 8, 1912. Mr. Tierney said that with petrol at 1s. 6d. per gallon, the costs worked out at 4d. per car-mile. They hoped by the use of paraffin to reduce the cost by 1½d. per car-mile. He did not advocate a petrol-electric system in preference to a purely electrical one where the latter could be obtained, especially on the account of the very superior acceleration obtainable with electric cars.

## THE PECKHAM RADIAL AXLE TRUCK.

This truck is designed for car bodies that require a 9 ft. or 10 ft. wheel base truck, and is particularly adapted for short radius curves. It is an improvement upon the Peckham patent pendulum truck, described in a previous issue. The special feature of this truck is the construction of its radial axle gears that support the truck frames upon the axle boxes in such a manner that the wheels and axles can adjust themselves to the curvatures of the rails, and move both laterally and radially independent of the truck frames, combining the lateral movement of the Peckham pendulum and radial trucks, described in our issue of February 6, without the use of a sub-truck.

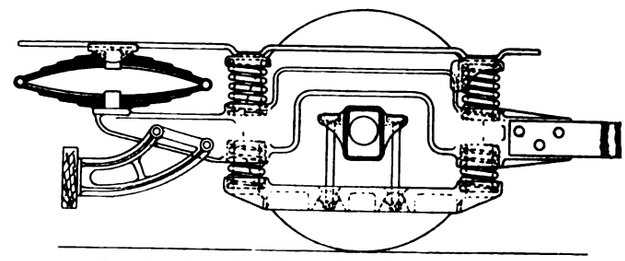

Fig. 1.—Construction of Radial Axle Gear.

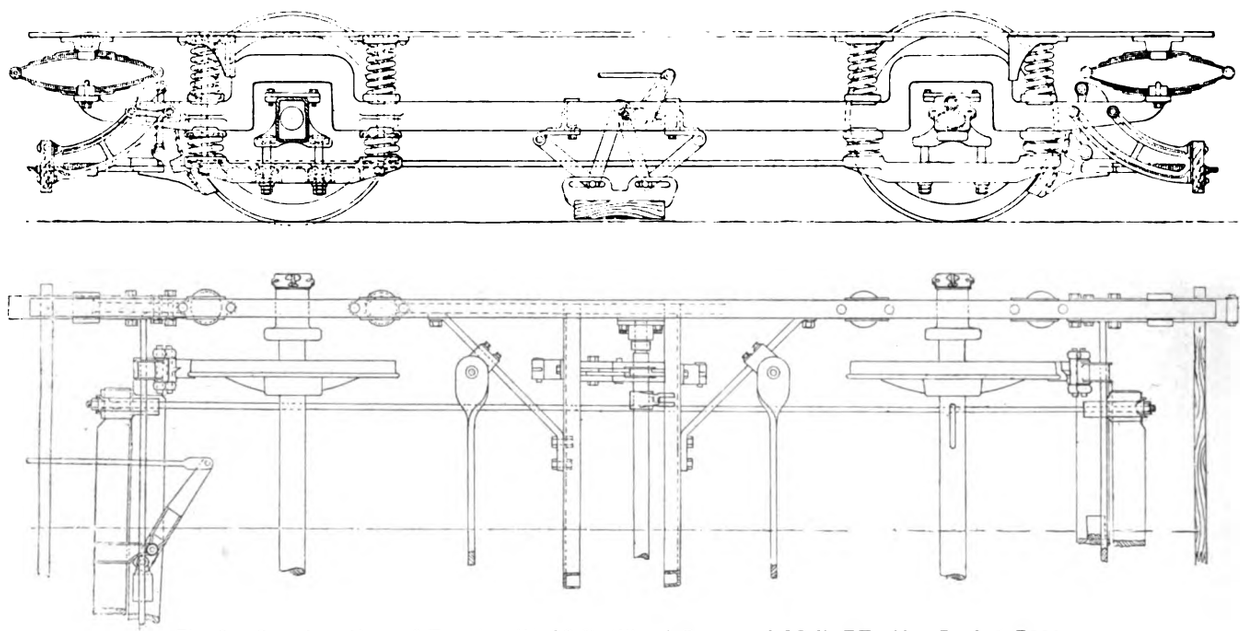

Fig. 2.—Construction of Truck with 10 ft. Wheel Base and 13 ft. Effective Spring Base.

Fig. 1 shows the construction of the radial axle gear. This consists of an independent auxiliary frame, supporting by springs the truck frames from the axle boxes by means of "ball-shaped links" suspended from the axle boxes. The width of the pedestal jaws and the length of the links are made to suit the length of wheel base and radius of curves. Fig. 2 shows the construction of the truck with a 10 ft. wheel base and

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13 ft. spring support of side frames (effective wheel base). Fig. 3 shows the Peckham radial axle gears as applied to a truck under a Derby Corporation car. The operation of this gear has been so satisfactory that the Derby Corporation have equipped all of their radial trucks with these gears. The manager states that the cars ride smoothly without galloping or side swinging, and that the current consumption has been reduced. These gears are also in successful operation on the Birmingham and Midland Tramways.

With the 8 ft. wheel base pendulum truck for 16 ft. to 18 ft. double (or 28 ft. to 30 ft. single) decked cars, and the 10 ft. radial axle truck for 18 ft. to 20 ft. double (or 30 ft. to 35 ft. single) decked cars, and the 12 ft. to 14 ft. wheel base, single axle radial truck for 22 ft. to 24 ft. double (or 35 ft. to 40 ft. single) decked cars, the Peckham system of flexible gears and long wheel base four-wheeled flexible geared trucks is complete, and can be adapted to all lengths of tramway cars.

The advantages of the Peckham flexible gears and long wheel base trucks have been demonstrated upon several tramways during the past three years. These advantages include smooth and easy riding of the cars; prevention of galloping thus enabling longer four-wheel cars to be used, and the prevention of grinding of wheel flanges on curves, obviating the necessity of machine turning of tyres, and increasing their mileage 15,000 miles. A material reduction in the consumption of energy and increased economy in the cost of maintenance of wheels, rails, and roadbed are also secured. It may be added that the Peckham pendulum and radial axle gears can be applied to all types of existing tramway and railway trucks.

## WELDED JOINTS AT NEWCASTLE.

In a paper on the Newcastle-on-Tyne tramways, read by Mr. J. McKellar, of the city engineer's staff, at a meeting of the Municipal and County Engineers, held in that city, it was stated that of the various kinds of welded joints that have appeared from time to time during the last 10 years, the Thermit welded joint has probably made the most headway. This joint has been adopted very largely by some corporations, notably at Manchester and Leeds. Last year the company responsible for it were entrusted with over 800 joints on the eastern Newcastle extensions, the work being executed by Thermit, Ltd., and the results will largely determine its future in this city. Another weld of a different type—viz., the Tudor weld—has evoked favourable opinion; but this weld is somewhat more costly. In the discussion, Mr. Foster (Leeds), said that they had used the Thermit joint for 11 years, and it had been their standard joint for nine years. They had some trouble with breakages during the earlier stages, but of 7,572 joints welded between the years 1908 and 1912 there had only been 37 breakages, or 0·5 per cent.

Fig. 3.—Peckham Radial Gears Applied to Derby Top-Deck Car.

**Australian Difficulty in Obtaining Rails.**—An indication of the large and growing field in Australia for railway and tramway material was given by Mr. T. R. Johnson, Chief Commissioner for Railways and Tramways of New South Wales, in his evidence before the Dominion's Royal Commission. During each of the last two years, he said, the department had met considerable difficulty in placing orders for 3,000 tons of rails, and after months of delay had only been able to secure them in lots of 1,000 a month. "We," continued Mr. Johnson, "want rails, and we want people to take our orders."

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## CONTRACTS AND ORDERS.

**Leyton Council** have accepted the tender of Mr. R. R. Todd, at £1,719, for the supply of new feeder cable.

**Croydon Council** have placed a contract with Mr. F. W. Honour for alterations and additions to the tramway offices.

**Dick, Kerr and Company** have obtained a contract for permanent way renewals in connection with Belfast Corporation Tramways.

**Babcock and Wilcox, Limited,** have received an order for the supply of steam, feed, and drain piping, etc., to Dundee Council, at £2,510.

**The Brush Company** have obtained a contract for supplying and erecting a 500-KW turbo-generator with condensing plant to Swindon Council.

**Rawtenstall Council** have placed an order with the British Thomson-Houston Company for a 1,500-KW. turbo-alternator, with condenser, etc.

**Walthamstow Council** have given a contract for a natural draught cooling tower at the electricity works to Messrs. Kater and Aukeromit, at £800. There were ten tenders.

**Chester Council** have accepted the subjoined tenders: Tudor Accumulator Company, storage battery, £7,470; Lancashire Dynamo and Motor Company, booster, £1,145.

**W. and A. Forsdike, Limited,** have received the contract for the erection of a building to house the new rotary converting plant at the Kelham Island power-station, Sheffield, at £3,210.

**Bullivant and Company** have received a contract to supply 15,000 ft. of 3½ in. cable for the Douglas Corporation Tramways. This is the seventh occasion that the company have been awarded similar contracts for Douglas.

**Walsall Council** have accepted the following tenders: British Westinghouse Company, 100-KW. rotary converter, at £636, and a high-tension feeder, at £70 10s.; Electrical Power Storage Company, renewal of storage batteries at three stations.

**Messrs. Paramors,** Margate, have received a contract for constructing at a cost of £15,062 the roadway and tramways on the viaduct to be built at the Dover Pier as an approach to the new marine station of the South Eastern and Chatham Railway.

**Derby Council** have accepted the following tenders: Newton Brothers, motor-alternator, at £1,835; Greaves and Company, chains for the coal elevator and conveyer; Brush Electrical Engineering Company, Limited, five roof covers for tramcars, £548.

**Glasgow Council** have placed contracts as appended: Bolckow, Vaughan and Company, steel rails and fish plates; British Thomson-Houston Company, 5,000-KW. turbo-alternator, for Pinkston power-station; Drake and Gorham, Limited, lighting fittings.

**Wolverhampton Council** have accepted the following tenders: Amies and Sharratt, additions to the electricity stores, £728; Vaughan and Sons, one 5-ton and one 3-ton overhead travelling crane, £105; Electric Construction Company, Limited, direct-current switch gear for the converter plant, £172.

**Liverpool Council** have accepted the tender of the National Steam Car Company for motor chassis for the tramways department, that of Pope's Electric Lamp Company for annual supply of 40-watt and 60-watt metal filament lamps, and that of J. Hunter and Sons, Limited, for 8,000 yards of worsted serge for use in the tramways and electricity departments.

**Bradford Council** have placed contracts as follow: Henry Barrett and Sons, steel work in connection with the erection of workshop extensions at Thornbury tramway depôt, at £1,230; Beecroft and Wightman, hard wood paving blocks to the tramways department; John Brown and Company, 200 steel tramcar tyres, at £350; Collier Brothers, four miles of grooved copper trolley wire, at £408.

**Doncaster Council** have given contracts as subjoined: Siemens Brothers Dynamo Works, alternator; Lancashire Dynamo Company, dynamo, at £168. Willans and Robinson, Limited, or J. Howden and Company are to receive a contract for a turbine and condenser, the decision being left to the chairman and vice-chairman of the Electricity Committee on the receipt of further information from the engineer.

**New Car Shed at Leeds.**—Messrs. W. Airey and Son's tender was recommended for acceptance at a meeting of Leeds Council for the erection at Sovereign Street of a tramway car shed, depôt, workshop, offices, and club for the employees. The amount of the tender was £23,199. It was stated that another tender came to £500 less, and the report was referred back to the Tramways Committee. On July 2 Airey and Son's tender was accepted.

**Sunderland Council** have allotted the following tenders: Sturtevant Engineering Company, air filter for new alternator; A.E.G. Company, Berlin, short-circuiting device for new alternator, also spare parts for alternator; Dick, Kerr, and Company, Limited, spare parts for alternator; Phœnix Dynamo Company, reinsulating one 750-KW. alternator; J. Thompson and Company, 1,500 yards wood troughing; B.I. and Helsby Cables, Limited, 4,000 yards L.T. cable, 500 yards E.H.T. cable; Crewdson and Hardy, 1,250 yards w.i. piping and bends.

**Newport Council** have accepted the tender of the A.E.G. Electric Company, Berlin, for a 3,000-KW. turbo-generator and steam condenser at £7,120, and the tender of the Lancashire Dynamo Company, Limited, for a 600-KW. direct-current generator at £925. Councillor Moxon, chairman of the Tramways and Electricity Committee, stated that the lowest English tender was £1,326 higher than the German firm's. The German firm gave a guarantee of delivery within 30 weeks, and of the 36 tenders received no other firm had come near that.

**Glasgow Corporation** have placed contracts as appended: E. Green and Sons, Limited, providing and erecting economisers at Port Dundas and St. Andrew's Cross power-stations, £2,705 and £1,848 respectively; Musgrave and Company, providing and erecting induced-draught fans at the same stations, £675 and £679 respectively; Balcke and Company, providing two air filters, £220 each; E. W. Bliss Company and W. C. Yuille and Company, Limited, gear wheels; British Westinghouse Company, Limited, car equipments, motors; British Thomson-Houston Company, Limited, car equipments, controllers.

**Manchester Corporation** have accepted the following tenders:

Drake and Gorham, Limited, traction type incandescent lamps; Estler Brothers, canopy trolley standards; Bolckow, Vaughan, and Company, Limited, steel fish plates; Bayliss, Jones, and Bayliss, Limited, steel tie bars; E. Green and Son, Limited, replacement of No. 3 economiser; S. P. Bidder and Company, repairs to chimney and exhaust pipe; General Electric Company, Limited, two 50-H.P. three-phase motors; Aiton and Company, low-pressure steam and water pipes; Siemens Brothers Dynamo Works Company, Limited, switch gear, bus bars, etc.; Holden and Brook, Limited, one electrically-driven boiler feed pump; Sturtevant Engineering Company, Limited, air filtration plant; De Bergue and Company, Limited, steelwork for foundations of 15,000-KW. turbo-generator; Bruce Peebles and Company, Limited, two 750-KW. motor converters; British Electric Transformer Company, Limited, requirements of 75-K.V.A. transformers; W. T. Henley's Telegraph Works Company, Limited, low-tension cable and paper-insulated cable; Electrical Engineering and Equipment Company, Limited, low-tension cable; Charles Macintosh and Company, Limited, rubber-insulated cable.

**Salford Council** have accepted the offer of Eccles Corporation to supply current for the tramways in Eccles for five years at 1·125d. per unit for a minimum consumption of 675,000 units per annum, and for all units consumed above that quantity at 0·75d. per unit. The Council have also accepted the following tenders: Bertram Thomas, copper strip for main lighting and power switchboard, £302; British Thomson-Houston Company, switch gear required for bulk supply at meter house of Lancashire Electric Power Company, £1,352; Brush Electrical Engineering Company, Limited, one double-deck, single-truck car body, with vestibule ends, £530; nine additional car bodies of a similar character at the price of £500 per car body, subject to a reduction of £30 per car body if after the experimental period has elapsed it is decided to have the nine car bodies without the vestibule ends; J. G. Brill and Company, 10 tramcar trucks, less wheels and axles, £548; Walter Scott, Limited, 1,000 tons of Sandberg steel tramway rails, at £7 7s. 6d. per ton.

**London County Council** have accepted tenders as under:

Frodingham Iron and Steel Company, slot rails and conductor tees for tramway construction, £12,812 10s.; Bolckow, Vaughan, and Company, track rails and fastenings of high silicon steel (Sandberg process), £25,071 15s.; Bolckow, Vaughan, and Company, special track rails, renewable guards, and fastenings of high silicon steel (Sandberg process), £17,476 10s.; Holt and Willetts, overhead travelling crane for Shoreditch sub-station, £285; J. Spencer and Company, overhead travelling crane for permanent way depot at Leven Road, Poplar, £72; Millars' Timber and Trading Company and William Griffiths and Company, Jarrah wood paving blocks for tramway tracks, and Burt, Boulton, and Haywood, and W. W. Howard Brothers and Company, creosoted deal paving blocks for tramway tracks, total value about £8,831; Fry Brothers, twelve months' supply of Guernsey granite setts for use in the tramway department, approximate amount, £3,709; Electro-Mechanical Brake Company, 30 car sets of unbreakable grid rheostats, £8 5s. a set, less 2½ per cent. discount; W. and G. Cannon and Sons, heating apparatus for Poplar permanent way depot; Bullers, Limited, supply of track insulators; Leeds Engineering and Hydraulic Company, two hydraulic accumulators and a pump for the third section of the central car repair depot, £206; British Insulated and Helsby Cables, supply during 1913-14 of copper bonds; Alfred Blackmore and Company, 30,000 tons of Yorkshire nuts, at the basis price per ton of 15s. 8d.; Gardner, Locket, and Hinton, 60,000 tons of Scotch washed singles, at 15s. 8½d. per ton; Wm. Cory and Sons, 70,000 tons of Scotch washed single nuts, at 15s. 10d.; iron castings for permanent way during the year ending April 30, 1914; T. Butlin and Company, £2,955; J. Crowley, £32; S. Griffiths, £123; J. Martin and Son, £2,627. For the supply of miscellaneous tramway parts and equipment for the year ended April 30 next: British Westinghouse Electric and Manufacturing Company, Dick, Kerr, and Company, Morgan Crucible Company, Liverpool Electric Cable Company, J. G. Ingram and Son, Crystalate Manufacturing Company, Bullers, Limited, Anti-Attrition Metal Company, F. W. Rowlands and Company, Carron Company, T. Summerson and Sons, Brightside Foundry and Engineering Company, J. Williamson and Company, J. Crowley and Company, Brydon and Company, S. Peace and Sons, and Hadfield's Steel Foundry Company. Existing contracts with the Morgan Crucible Company, the Sloan Electrical Company, and William Geipel and Company for the supply of carbon traction motor and other brushes for electrical machinery have been extended for a year. Stores for the year ending April 30, 1914: Steel and iron castings for permanent way depot for the tramway department, Edgar Allen and Company, £1,568, R. Hyde and Son, £338, National Steel Foundry, Limited, £860; enamelled iron sign plates for the tramway department, Falkirk Iron Company, £36; foundations for power turning lathes for the third section of the central car repair depot, J. and C. Bowyer, £535; Western Electric Company, high and low-tension electric cables, £25,409 16s. 8d.; Hadfield's Steel Foundry Company, steel and iron castings for permanent way during the year ending April 30, 1914, £144.

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## FINANCIAL REPORTS.

**Bombay Tramways Dividend.**—The directors recommend a dividend of 5 per cent. on the ordinary shares for the year ended December 31, an increase of 2 per cent. over 1911.

**Mexico Tramways Company.**—The net revenue for 1912 amounted to 1,830,480 dols., and 786,566 dols. was brought forward. Four quarterly dividends at the rate of 7 per cent. per annum have been paid, leaving 1,462,928·51 dols. to be carried forward.

**Hull Corporation Tramways.**—The accounts for the year ended March 31 show that the total revenue was £158,441 (including £157,048 traffic revenue), and net working expenses £111,564. Of the net balance of £13,435, £12,000 has been devoted to relief of rates and £435 transferred to reserve fund. Traffic revenue per car-mile was 9·33d.; working expenses, including power, were 6·63d.

**Aberdeen Corporation Tramways.**—During the year ended May 31 the tramway receipts amounted to £80,150, an increase of £2,974 compared with the previous year. The number of passengers carried was 18,766,856, as against 18,096,938. The miles run numbered 1,738,966, compared with 1,643,242. For the past three years the receipts show an aggregate increase of £9,029. The P-A-Y-E cars on the Woodside route continue to meet with success, the receipts on this section showing an increase of £153 from their inauguration on April 28 up to May 31.

**Burnley Corporation Tramways.**—The past year at Burnley has been the most successful on record. The total revenue amounted to £79,890, as compared with £72,709. The increase is attributed to popularity of the service and to good trade. The increased number of top-covered cars has been much appreciated. The working expenses were £49,430, as compared with £45,455. The increase is explained by additional mileage, higher wages, and increased cost of materials. Interest on capital required £6,474; sinking fund, £6,491; rent of tramways, £2,061; income tax, £893; to the reserve fund was allocated £5,791; while £8,750 was paid to the borough fund as profit. The total revenue per car-mile was 13 22d., as compared with 12·61d.; and the average working expenses 8·183d., as compared with 7·895d. Owing to the judgment in favour of tramways being given the same allowance as railways, there has been a substantial saving in the payment of rates as compared with last year. An attempt is being made to develop the heavy parcel traffic by the goods wagon illustrated in our issue of December 12, 1912, and the results give fair promise of success.

**A Compliment to the Brighton Management.**—In moving the adoption of the general manager's annual report, Alderman Wilson, chairman of the Tramways Committee, said that if they had asked him four years ago whether the tramways would be on the rates by this time, he would have said they would be. They were certainly doing a great deal better than any of them had expected five or six years ago. One disadvantage the system was suffering from now was the cost of renewals and track. That would continue, and the committee proposed to spend as far as possible the whole of their balance. They did not propose to put any more to the actual reserve fund until they had renewed the whole or the greater part of the tramway. The committee's report showed that there was a net profit of £931 after meeting interest and sinking fund charges. The total revenue for the year was £53 798, against £54,027 in 1911-12. The working expenses, which include the whole cost of the renewals, amounted to £39,506, a decrease of £1,554. The tramways were last year assessed as light railways for the district rate, paying one-fourth, the poor rate remaining the same.

**Nottingham Corporation Tramways.**—The report of Mr. J. Aldworth, tramways manager and electrical engineer, for 1912-13, shows that the receipts, exclusive of interest on investments, amounted to £167,160, an increase of £4,562. The increase arising from the falling of two Easters in the financial year was about equalised by there being one working day less, the previous year being leap year. The working expenses amounted to £108,274, an increase of £2,111, leaving a balance of £58,886. The balance has been appropriated as follows: Interest on stock and loans, £14,349; repayment of capital, £19,762; in aid of general district rate, £19,000; reserve and renewals fund, £4,775; part cost of removal of centre poles, £1,000. The increase in expenditure is attributed to the addition of £1,340 in the wages of the traffic staff, and an increase of £554 in traffic expenses, including the cost of route numbers and ticket boxes fitted to the cars. There was a saving in the consumption of electric energy, which averaged 1·65 units, or 2·06d. per mile. The maintenance charges amounted to £18,683. Of this £8,517 was expended on cars, £1,305 on the overhead electrical equipment, and £8,161 on the permanent way. The average receipts per car-mile were 11·50d. (as compared with 11·22d.), the average working expenses 7·45d. (7·32d.) and the percentage of expenses to receipts 64·19 (65·29).

**Sheffield Corporation Tramways.**—During the year ended March 25, 96,330,242 passengers were carried, and the tramway receipts were £361,845, which, with motor omnibus receipts, made a total of £362,128, an increase of £21,137 on the previous year. The total working expenses of the cars were £207,690, and those of the omnibuses £134; leaving net revenue or gross profits at £154,303. After payment of interest, income tax, and other charges, there is a balance of £77,296 (an increase of £8,561), and of this £30,234 is appropriated for the general district rate. Since 1896, out of profits £237,084 has been voted in relief of the district rate. The expenditure on renewals of permanent way was £27,059. The undertaking has been maintained in efficient working order, no less than £49,390 having been spent out of income in general repairs and maintenance during the year. The car-miles run totalled 8,071,188, as against 7,720,026; passengers carried, 96,330,242, as against 90,458,851; percentage of working expenses to ordinary income, 57·389, as against 57·655; average total revenue per car-mile, 10·760d., against 10·698d.; average fare per mile, ·386d., as against ·416d.; average journeys per head of population per annum, 206·536, against 198·465; number of service cars in stock, 279, against 269; amount of sinking fund applied in reduction of debt, £341,370, against £301,508.

**J. G. White and Company.**—Lord Arthur Butler presided at the ordinary general meeting of J. G. White and Company, Limited, at the Cannon Street Hotel, on June 26, and in moving the adoption of the report, said there was a net profit for the year of £88,797, an increase of £1,691 over last year's figure, and, with the exception of 1911, the year under review was the most successful in the history of the company. After making substantial additions to the reserve accounts, the directors recommended dividends at the same rate as for the past two years. Investments, now standing at £163,728, were about £32,000 less than last year, which was due to the sale of certain securities at a substantial profit. Their most important investment was the Municipal and General Securities Company, which was doing an increasing and successful financial business, and had paid dividends of 10 per cent. on its capital after making liberal allocations to reserves. It was considered highly probable that next year their investment account would show a higher figure than at present. The report was adopted unanimously, and dividends were ordered to be paid as follow: Six per cent. on the cumulative preferred shares for the half-year to February 28 (making 12 per cent. for the year), 6 per cent. on the ordinary shares (making 12 per cent. for the year); and an extra dividend of 10s. per share on the ordinary capital for the year, making a total of 62 per cent. on the ordinary shares.

**Wolverhampton Corporation Tramways.**—The results of the Wolverhampton surface-contact tramways show that a well-designed system carefully maintained will give very satisfactory results. Last year's working has been very successful, and the manager, Mr. W. A. Luntley may be congratulated on the result. The net profit, after paying all capital and sinking fund charges and income tax, amounted to £12,021, on the tramways, and including the profit of £307 from the motor chars-a-bancs service, there is a surplus of £12,328. The Tramways Committee have contributed £3,777 towards the rates, equivalent to 2¼d. in the £, and have raised the reserve and renewal fund to £50,220. The total traffic receipts, which amounted to £53,963, as compared with £51,452, constitute a record. Working expenses amounted to £30,528, as compared with £29,648; percentage of working expenses to total revenue 55 75, as compared with 56·73; average traffic revenue per car-mile 11·086d., and total working expenses 9·53d. The average consumption of energy amounted to 1·388 units per car-mile. There are 49 cars, and the length of track is 21 miles 40 chains. The increase in expenses is due to the extra cost of material and to concessions to employees. The motor chars-a-bancs service is giving good results. The working costs, including depreciation, amounted to 8·107d. per mile, a very creditable result.

**Bradford Corporation Tramways.**—The extension of the period during which halfpenny fare facilities are given is stated to be mainly responsible for the reduction in the net profit on the tramway undertaking in the city treasurer's balance sheet for the year ended March 31. The net profits amounted to £41,921, as compared with £52,782 for the preceding year. The traffic income (£279,524) showed an increase of £6,044, but as there had been an increase in the mileage run amounting to 271,000 car-miles the income per car-mile worked out at a lower figure than in the previous year—11·3d. as compared with 11·6d. Wages of drivers and conductors accounted for an increase of £4,456, of which £2,000 was in respect of advances in wages and £2,500 in respect of increased staff consequent on the additional mileage. £12,800 was paid in rates—£1,300 more. Repairs and maintenance cost £42,900, an increase of £7,000. Electric power cost £46,000, the larger mileage run being responsible for an increase of £2,000. Per car-mile the cost of power worked out at 1¾d. From the parcels department there was an income of £9,500, an increase on the year of £1,200. The profit (£1,067) showed an improvement on the year of £136. As a whole the undertaking made a gross profit of £98,617. From this there had been paid as interest on loans £24,770, and £31,926 had been set aside for sinking fund purposes, leaving a net profit of £41,921, which had been carried to the reserve and renewal account. This account had to its credit at the beginning of the year £75,120, and after payment of £9,000 in relief of rates and £19,000 for renewal of permanent way the account at the end of the year stood at

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# TRAMWAY AND OMNIBUS SHARE LIST.

## Specially Compiled for "The Tramway and Railway World."

| Amount Ranking for Dividend. | Shares. | Name. | Div'd. Prev. Half-year. | Div'd. Last Half-year. | Quotations, July 3. | Movement During June. Rise. | Movement During June. Fall. | Latest Business Done. Price. | Latest Business Done. Date. | Yield on Buying Price. £ s. d. | Dividend Due. (Final in Italics.) | Quotations, Jan., 1908, to July 3, 1913. Highest | Lowest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 640,000 | 5 | Anglo-Argentine Tramways 5½% Cum. 1st Pref. | 2/9 | 2/9 | 4¾—5xd | ... | ... | 98.9 | July 2 | 5 10 0 | Jan., Dec. | 5⅛ | 4¼ |
| 500,000 | 5 | Do. do. 5½% Cum. 2nd Pref. | 2 9 | 2 9 | 4⅞—4 1/16xd | ... | ... | 88.9 | July 3 | 5 17 6 | June, *Dec.* | 5⅛ | 4 7/16 |
| 1,500,000£ | ... | Do. do. 5% Deb. Stock Red. | 5% | 5% | 95½—97xd | ... | ... | 97½ | July 3 | 5 2 6 | June, Dec. | 105½ | 95½ |
| 325,532£ | Stk. | Auckland Elec. Trys. Co. 5% Mort. Deb. ... | 5% | 5% | 99—101xd | ... | ... | 99½ | July 1 | 4 19 0 | Jan., July. | 107 | 101 |
| 75,000 | 1 | Bath Electric Tramways 5% Cum. Pref. ... | 6d. | 6d. | 1/16—¼xd | ... | ... | 14/6 | Dec. 31 | 6 3 3 | *Jan. & July* | 7/16 | 7/16 |
| 334,696£ | Stk. | Birmingham Dist. Pow. & Tract. 4½% 1st Deb.... | 4½% | 4½% | 86—88xd | ... | ... | 87½ | July 2 | 5 2 3 | Jan., July. | 96 | 77 |
| 15,000 | 10 | Blackpool and Fleetwood Tramways ... ... | 4/- | 9/- | 13⅜ -14⅜ | ... | ... | 14 | Mar 10 | 4 12 0 | Feb., Aug. | 14½ | 12 |
| 60,000 | 10 | Bombay Elec. Supply & Trys. Co. 6% Cum. Pref. | 6/- | 6/- | 10¾—11½ | ... | ... | 10⅞ | June 12 | 5 4 6 | Feb., Aug. | 12½ | 7⅜ |
| 1,003,614 | $100 | Brazil Traction... ... ... ... ... ... | 6 | 6 | 86—88 | ... | — 9 | 87½ | July 3 | 6 19 6 | Fb.My Ag.Nv. | 105½ | 86 |
| 75,000 | 5 | Brisbane Elec. Tramways Investment Co. Ord. | 4/- | 4/- | 6⅛—7⅜ | ... | ... | 7⅛ | July 3 | 5 8 6 | *May*, Oct. | 9⅛ | 3 7/16 |
| 75,000 | 5 | Do. do. do. 5% Cum. Pref. | 2/6 | 2/6 | 4¾—5⅛ | ... | ... | 97/6 | June 27 | 4 17 9 | *May*, Nov. | 5⅜ | 4⅜ |
| 50,000 | 10 | Bristol Tramways and Carriage Co. ... ... | 4 | 4 | 5¾—6¼ | ... | ... | 5⅜ | Nov. 9/10 | 6 8 0 | *Feb.*, Aug. | 14½ | 5 |
| 50,000 | 10 | Do. do. do. 4% Cum. Pref. | 4 | 4 | 7—7¼xd | ... | ... | 7 | Sept. 30 | 5 10 6 | Jan., July. | 9½ | 6¾ |
| 800,000£ | Stk. | British Columbia Electric Railway Def. Ord. .. | 8% | 8% | 121—126 | ... | — 5 | 124 | July 3 | 6 8 0 | May, Nov. | 156 | 121 |
| 800,000£ | Stk. | Do. do. Pref. Ord. ... ... | 6% | 6% | 107—112 | ... | — 1 | 110 | July 2 | 5 9 3 | Feb., Aug. | 132⅛ | 105 |
| 800,000£ | Stk | Do. do. 5% Cum. Perp. Pref. | 5% | 5% | 101—104 | ... | — 1 | 103½ | July 2 | 4 18 0 | Jan., July. | 114 | 99 |
| 1,070,097£ | Stk. | British Electric Traction Prefd. Ord. ... ... | ... | ... | 8½—10½ | ... | — 2½ | 8½ | July 3 | ... | Apr., *Oct.* | 16 | 8½ |
| 403,503£ | Stk. | Do. do. 6% Cum. Pref. .. | 6% | 6% | 78—81 | ... | — 6 | 83 | June 20 | 7 8 3 | Feb., *Aug.* | 95¼ | 78 |
| 1,464,245£ | Stk. | Do. do. 5% Perp. Deb. ... | 5% | 5% | 89—93 | ... | ... | 92½ | July 3 | 5 7 6 | April, Oct. | 101 | 82½ |
| 439,796£ | Stk. | Do. do. 4½% 2nd Deb. Red. ... | 4½% | 4½% | 73—77 | ... | — 1 | 75½ | June 26 | 5 17 0 | May, Nov. | 84 | 58 |
| 246,625£ | Stk. | Buenos Aires Port & City Trys. 6% 1st Mt. Deb. | 6% | 6% | 92—96 | ... | ... | 92 | June 23 | 6 6 6 | Feb., Aug. | 103 | 61 |
| 623,270£ | Stk. | Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt Deb. | 5% | 5% | 38½—100½ | ... | — ½ | 93⅛ | July 1 | 5 0 6 | Mar., Sept. | 103 | 89 |
| 137,610 | 5 | Calcutta Tramways Ord. ... ... ... .. | 2/6 | 5/- | 5⅜—6⅛ | ... | ⅛ | 5⅞ | June 30 | 6 2 6 | *Apr.*, Oct. | 7⅛ | 4 |
| 47,295 | 5 | Do. 5% Cum. Pref. ... .. | 2/6 | 2/6 | 4 1/16—5 1/16xd | ... | ... | 5 | June 17 | 4 18 9 | Jan., July | 5⅛ | 4⅛ |
| 491,222 | 1 | Cape Electric Tramways ... ... ... ... | 1/- | for '12 | 1/16—1/16 | ... | ... | 15/6 | June 4 | 6 3 3 | Feb., *Nov.* | 1/16 | 1/16 |
| 15,000 | 10 | Carthagena and Herrerias Steam Tramways ... | 1/- | May, '12 | 3½—4 | ... | ... | 75 - | May 6 | ... | April. | 7 | 3 |
| 248,000 | 5 | City of Buenos Ayres Tramways (1904) ... | 2/6 | 2/6 | 5½—5⅝ | ... | ... | 5 1/16 | July 3 | 4 15 3 | Fe My.Au No | 6 | 5⅛ |
| 120,000£ | Stk. | Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ... | 5% | 5% | 90½—94½ | ... | ... | 96 | Jan. 31 | 5 6 0 | May, Nov. | 101 | 87 |
| 11,500 | 10 | Cork Electric Tramways and Lighting Co. ... | ... | 6/- ann. | 4¼—4¾ | ... | ... | 4 3/8 | Dec. 23 | 6 6 6 | *Mar.* | 10 | 4¼ |
| 12,327 | 10 | Do. do. do. 5% Cum Pref. | 5/- | 5/- | 7¾—7¾xd | ... | ... | 8 1/16 | June 12 | 6 9 0 | Jan., July | 10⅜ | 7½ |
| 3,000 | 10 | Dublin and Lucan Elec. Railway 5% Cum. Pref. | 5/- | 5/- | 8½—9 | ... | ... | 9 | Aug. 25/10 | 5 11 3 | Sep.15 Mar.15 | 9¼ | 6 |
| 60,000 | 10 | Dublin United Tramways Co. (1896), Ltd., Ord. | 6/- | 6/- | 11¼—11⅜ | ... | ... | 11 1/16 | June 27 | 5 2 3 | Feb., Aug. | 14 | 11 |
| 60,000 | 10 | Do. do. do. 6% Cum. Pref. | 6/- | 6/- | 11¾—12⅜ | ... | ... | 12⅛ | June 23 | 4 14 3 | *Feb.*, Aug. | 14 | 11½ |
| 13,500 | 10 | Gateshead & District Trys. Co. Ord. ... ... | 5/- | 9/- | 8½—9 | ... | ... | 8 1/16 | Apr. 7 | 7 15 0 | *Mar.*, Sept. | 9¼ | 7⅞ |
| 268,235 | 10/- | Hastings and District Elec. Trys Ord. ... ... | ... | ... | 1/8—1/4 | ... | ... | 1/9 | Jan. 5/12 | ... | ... | 1/8 | 1/8 |
| 80,000 | 1 | Do. do. 6% Cum. Pref. ... | 6% | 6% | 1/8—1/4 | ... | ... | 12/6 | June 6 | 8 7 0 | ... | 1/4 | 1/8 |
| 125,000£ | Stk. | Do. do. 4½% Deb. Stk. Red. | 4½ | 4½ | 68—73 | ... | ... | 73½ | Feb. 8/12 | 6 3 3 | April, Oct. | 100 | 68 |
| $9,634,000 | $1,000 | Havana Elec. Rly. Co. Con. Mort. 5% ... | 5% | 5% | 97—101 | ... | ... | 97 1/16 | Mar. 29 | 5 2 0 | Feb., Aug | 105 | 80 |
| 195,000£ | 100 | Hong Kong Tramways Co. 5% Mt. Deb. ... | 5% | 5% | 85—89 | ... | ... | 90 | May 2 | 5 12 6 | May, Nov. | 92 | 75½ |
| 20,000 | 10 | Imperial Tramways Ord. ... ... ... ... | Nil | 4% year | 4—4¼xd | ... | ... | 9¼ | Oct. 29/09 | 8 18 0 | Feb., Aug. | 9¾ | 2¼ |
| 20,000 | 10 | Do. do. 5% Cum. Pref. ... ... | Nil | 6% year | 7—7½xd | ... | — ½ | 6 7/16 | Ju. 28/09 | 8 0 0 | Jan., July. | 9¼ | 2⅞ |
| 30,000 | 5 | Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref. | 2/6 | Dec. 12 | 2⅛—2⅜ | ... | ... | 46/3 | Nov. 30 | 4 15 3 | *Mar.*, Sept. | 3 | 3/4 |
| 250,000 | 1 | Kalgoorlie Electric Tramways ... ... ... | ... | ... | 1/32—3/32 | ... | ... | 1/- | Jan. 15/12 | ... | *May* | 3/16 | 1/32 |
| 170,000 | 1 | La Plata Elec. Trys. Co. 6% Cum. Pref. ... | 0 4·65 | May, '13 | 1 3/16—1 5/16 | ... | ... | 19/6 | May 2 | ... | *April*, Oct. | 1 1/16 | 1/2 |
| 30,800 | 10 | Lanarkshire Tramways ... ... ... ... | 5/6 | 6/- | 10—10½ | ... | ... | 10 | May 27 | 5 9 6 | Feb., Aug. | 10 1/16 | 9⅜ |
| 250,000£ | Stk. | Lancashire United Trys. 5% Prior Lien Deb.... | 5% | 5% | 76—78xd | ... | ... | 78½ | Mar. 26 | 6 8 3 | Jan., July. | 95 | 76 |
| 634,026 | 1 | Lisbon Electric Tramways Ord. ... ... ... | 7½d. | 7½d. | 1⅛—1 1/16 | ... | ... | 22/6 | May 21 | 4 11 6 | *July.* | 1 3/16 | 3/8 |
| 425,553 | 1 | Do. do. 6% Cum. Pref ... | 7½d. | 7½d. | 1 1/16—1 1/8xd | ... | ... | 22/6 | Feb. 15 | 5 1 3 | Jan., July. | 1⅛ | 1/2 |
| 1,666,673 | 1 | London and Suburban Traction Ord. ... ... | ... | ... | 1/32—1/32 | ... | ... | 6/3 | June 30 | ... | ... | 1/8 | 1/32 |
| 1,316,268 | 1 | Do. do. do. 5% Cum. Pref. ... | ... | ... | 1/32—1/32 | ... | ... | 12/6 | July 3 | 6 19 3 | ... | 1/16 | 1/32 |
| 1,000,000£ | Stk. | London General Omnibus 4½% 1st Deb. ... ... | ... | 4½ | 92—94xd | ... | ... | 93½ | July 3 | 4 15 9 | Jan., July. | 98 | 92½ |
| 1,000,000£ | Stk. | Do. do. 5% Cum. Income ... | ... | 5 | 88—90 | ... | ... | 88⅝ | July 3 | 5 12 6 | Feb., Aug. | 94 | 87½ |
| 1,649,930£ | Stk. | London United Tramways 4½% 1st Deb. Stk. ... | 4 | 4 | 59—63xd | ... | ... | 5⅛ | Dec. 5 | 6 7 0 | *Jan.*, July. | 63 | 59 |
| 63,430£ | Stk. | Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ... | 5% | 5% | 101—103xd | ... | ... | 102¾ | Mar. 7 | 4 17 3 | Jan., July. | 105 | 86 |
| 20,000 | 5 | Do. Do. Do. 6% Cum. Pref. ... | ... | ... | 4¾—5⅛ | ... | ... | 98/9 | July 3 | ... | ... | ... | ... |
| 300,000£ | 100 | Manaos Trys. & Ltg. Co. 5% 1st Debs. ... ... | 5% | 5% | 87½—90½xd | ... | ... | 90½ | May 22 | 5 10 6 | Jan., July. | 97 | 86 |
| $4,785,000 | $1,000 | Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds. | 5% | 5% | 98½—100½ | + ½ | ... | 99¾ | July 3 | 5 3 0 | Mar., Sept. | 104⅜ | 84 |
| 60,000 | 1 | Mansfield & District Trys. Ltd. 6% Cum. Pref. | 7½d. | 7½d. | 1/8—1 1/16 | ... | ... | 19/3 | Sept. 5 | 5 13 0 | Mar., Sept. | 1 1/16 | 3/4 |
| $16,487,400 | $100 | Mexico Tramways Common Stock ... ... | $5½ | $5½ | 94—97 | ... | — 8 | 94 | July 3 | 7 7 9 | Fb.My.Au No | 151⅛ | 65 |
| $3,840,000 | ... | Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds | 5% | 5% | 93—95 | ... | ... | 93 | June 20 | 5 8 3 | May, Nov. | 101⅛ | 92½ |
| 600,000£ | 100 | Montreal Street Rly. 4½% Ster. Debs. ... ... | 4½% | 4½% | 99—101 | + 1 | ... | 98½ | June 26 | 4 10 6 | Fe.My.Au.No. | 107 | 38 |
| 150,000 | 1 | National Steam Car ... ... ... ... .. | 2/- | year | 1 1/32—1 1/16 | ... | — 1/32 | 24 - | July 2 | 7 16 3 | Dec. | 39·9 | 23 - |
| 5,000 | 10 | Oldham, Ashton, and Hyde Elec. Tramways Ord. | 5/- | 7 - | 6⅜—6½ | ... | ... | 7 | Apr. 2 | 9 8 3 | Mar., Aug. | 9⅜ | 6⅛ |
| 5,000 | 10 | Do. do. do. 5% Cum. Pref. | 5% | 5% | 6⅛—6⅜ | ... | ... | 6 13/16 | July 8 | 7 11 0 | Feb., Aug. | 8⅜ | 6⅛ |
| 77,893 | 5 | Para Elec. Rly. and Ltg. Co., Ord. ... ... | 5/- | 5/- | 6⅛—7⅛ | ... | — ¼ | 6 1/16 | June 27 | 7 0 6 | May, Nov. | 8 | 6 |
| 100,000 | 1 | Perth (W.A.) Electric Tramways Ord. ... ... | 6d. | 7½d. | 1 1/16—1 1/16 | ... | ... | 25/6 | Nov. 8 | 4 7 9 | *Sept.*, Nov. | 26/10½ | ⅜ |
| 245,000 | 1 | Potteries Electric Traction Ord. ... ... ... | 3½ | for '11 | 1/32—1/16 | + 1/32 | ... | 7/6 | Dec. 2 | 8 12 3 | April. | 3/8 | 1/8 |
| 245,000 | 1 | Do. do 5% Cum. Pref. ... | 6d. | 6d. | 1/16—1/16 | ... | — 1/32 | 12/6 | May 2 | 7 5 6 | *Feb.*, Aug. | 3/8 | 1/16 |
| 124,560 | 1 | Provincial Tramways Ord. ... ... ... ... | 10d. | 8d. | 1/4—1/2xd | ... | ... | 14/6 | June 26 | 9 12 0 | May, *Nov.* | 1 1/16 | 13/- |
| 10,000 | 10 | Do. do. 6% Cum. Pref. ... ... | 6/- | 6/- | 9⅛—9⅜xd | ... | ... | 9½ | June 26 | 6 8 0 | June, *Dec.* | 11 | 9 |
| 50,000 | 5 | Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref. | 3/- | 3/- | 5¼—5⅜xd | ... | ... | 5⅜ | Apr. 26 | 5 4 6 | June, Dec. | 6 | 5 |
| 32,000 | 10 | Shanghai Elec. Construction Co. ... ... ... | 10/- | year | 8½—9½ | + ¾ | ... | 9 | June 26 | 5 5 0 | May. | 11⅛ | 6 |
| 330,400£ | Stk. | Singapore Elec. Trys. Ltd., 5% Debs. Red. ... | 5% | 5% | 83½—87½ | ... | ... | 85 | Apr. 8 | 5 14 3 | Mar., Sept. | 89 | 61 |
| 169,570 | 1 | S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref. | 1/2½ | May, '12 | ⅜—¾ | ... | ... | 15/9 | May 16,'12 | 8 0 0 | Feb., Aug. | 1⅜ | ⅜ |
| 91,720£ | Stk. | Southern Elec. Trys. of B.A., 1st Mt. Deb. ... | 5% | 5% | 96—98 | ... | ... | 96 | Mar. 6 | 5 3 3 | Feb., Aug. | 100 | 90 |
| 471,500£ | 100 | Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ... | 4½% | 4½% | 98—100 | ... | ... | 98½ | May 8 | 4 11 0 | Feb., Aug. | 104 | 97 |
| 80,000 | 5 | United Elec. Tramways of Monte Video, Ord.... | 3/- | 4/- | 4⅜—4⅝xd | ... | — ¼ | 4¼ | June 20 | 7 1 9 | *June*, Dec. | 6⅛ | 4⅜ |
| 90,000 | 5 | Do. do. do. 6% Cum. Pref. | 3/- | 3/- | 4⅜—5⅛xd | ... | ... | 5 1/16 | June 6 | 5 17 3 | June, Dec. | 6⅜ | 4 7/16 |
| 500,000£ | Stk. | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs. | 4½% | 4½% | 98½—101½ | ... | — ½ | 99½ | July 3 | 4 9 6 | Apr., Oct. | 109⅛ | 98½ |
| 40,977 | 5 | Yorkshire (West Riding) Elec. Trys. Ord. ... | ... | ... | ¼—¾ | ... | ... | 8/6 | Oct. 31 | ... | *Mar.* | 1⅛ | ⅜ |
| 46,261 | 5 | Do. do. do. 6% Cum. Pref. | 1/6 | 1/6 | 3 1/16—3 1/8xd | ... | ... | 72/6 | June 5 | 3 19 0 | *Mar.* | 3⅜ | 1⅜ |

## ELECTRIC RAILWAY SHARES.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,854,720£ | Stk. | Central London Ord. Stock (4% Guar.) ... ... | ... | ... | 77—79 | ... | — 5 | 78½ | July 3 | 5 1 3 | *Feb.*, Aug. | 89¼ | 59⅛ |
| 572,640£ | Stk. | Do 4% Pref. Stock ... ... ... | 4 | 4 | 80—82 | ... | — 4 | 82 | June 23 | 4 18 9 | Feb., Aug. | 92 | 80 |
| 572,640£ | Stk. | Do. Deferred Stock (4% Guar.) ... | ... | ... | 76—78 | ... | — 4 | 77 | July 1 | 5 4 0 | Feb., Aug. | 91⅜ | 42 |
| 78,000 | 10 | Great Northern and City Pref. Ord. 4% | Nil | Nil | 1⅞—2⅛ | ... | — ⅛ | 37/6 | June 10 | ... | *Feb.*, Aug. | 2⅛ | ⅛ |
| 50,000 | 10 | Liverpool Overhead Ord. ... ... ... ... | 2/- | 2/6 | 3⅛—4 | ... | ... | 80 - | June 26 | 5 16 3 | *Feb.*, Aug. | 4 | 2 |
| 1,412,263£ | Stk. | Mersey Cons. Ord. Stock ... ... ... ... | Nil | Nil | 4⅛—5⅜ | ... | — ½ | 5 | June 21 | ... | *Feb.*, Aug. | 8 | 1 |
| 5,732,062£ | Stk. | Metropolitan Cons. ... ... ... ... .. | 1½ | 1½ | 45½—46½ | ... | — 4 | 46⅛ | July 3 | 3 10 3 | *Feb.*, Aug. | 75⅛ | 34 |
| 2,640,914£ | Stk. | Do. Surplus Lands Stock ... ... | 2½ | 2½ | 61—63 | ... | — 1 | 61 | June 19 | 4 7 6 | *Feb.*, Aug. | 72 | 60⅜ |
| 3,235,000£ | Stk. | Metropolitan District Ord. ... ... ... ... | Nil | Nil | 33½—34 | ... | — 4½ | 34 1/16 | July 2 | ... | *Feb.*, Aug. | 51½ | 9⅛ |
| 467,000 | 10 | Underground Electric Railways Co. of London | ... | ... | 3⅜—3⅝ | ... | — ⅛ | 70/- | July 3 | ... | ... | 5 1/16 | 1⅜ |
| 1,730,000£ | ... | Do. 4½% Bonds of 1933 ... ... ... | 4½% | 4½% | 96—98xd | ... | ... | 97 | July 2 | 4 12 0 | Jan., July | 102 | 73 |
| 1,192,707£ | ... | Do. 6% 1st Income Debs. ... ... | 6% | 6% | 108—110 | ... | — 2 | 109½ | July 3 | 5 9 3 | Mar., Sept. | 117½ | 108 |
| 6,120,750£ | ... | Do. 6% Income Bonds ... ... ... | 40/- | 60/- | 89—90 | ... | — 1 | 89¼ | July 3 | 5 11 0 | Mar., Sept. | 97½ | 18 |

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£89,000. From this sum the Council had voted in relief of rates a sum of £17,000.

**The Imperial Tramways Company.**—The directors report that the scheme of arrangement which was approved by both classes of shareholders, has received the sanction of the High Court. Accordingly, the arrears of dividend on the preference shares to December 31, 1911, have been cancelled, and ordinary shareholders have relinquished their exclusive rights in the ordinary shares dividend fund, which will in future form part of the dividends equalisation fund applicable to maintenance of dividends on both preference and ordinary capital. The investment in the London United Company has been written down, and the sum of £85,000 has been transferred from the reserve fund for renewals and contingencies for that purpose, leaving the present amount of the reserve funds at £65,122. The directors state that, in their opinion, the shareholders may now look for the regular payment of preference dividend and the maintenance of at least 4 per cent. on ordinary share capital. The revenue account shows an available amount of £24,255, and after payment of interest on debenture stock for the whole year there is a balance, including £7,678 brought forward, of £19,221, which the directors recommend should be appropriated as follows: Dividend at 6 per cent. for the year on preference capital (less income tax), £11,300; dividend at 4 per cent. for the year on ordinary capital (less income tax), £7,533; and to carry forward £388. A portion of the investment in the London United Tramways, Limited, has been disposed of, 20,000 shares out of the 44,446 £10 preference shares having been sold. The permanent way of the Middlesbrough, Stockton, and Thornaby tramways has been further renewed, so that two-thirds of the track has been relaid. The reconstruction of the remainder will probably be completed this summer.

**Glasgow Corporation Tramways.**—The Finance Sub-committee of the Tramways Committee on June 9 approved of the financial statement of the tramways department for the year ended May 31. For the first time the revenue has reached a million sterling. During the past twelve months the extended halfpenny distance has been in full operation, and 191,944,261 passengers have been carried at this fare. In addition to the 121,212,468 carried in the year ended May 31, 1912, over this extended distance there were 9,062,479 carried on the first two-stage and 9,058,682 on the second two-stage of the former two-stage ticket system. Subjoined are the details of the statement:

REVENUE.

| | Year to May 31, 1913. | Year to May 31, 1912. |
|---|---|---|
| | £ s. d. | £ s. d. |
| Traffic receipts ... ... ... ... ... | 1,007,652 17 6 | 987,280 2 3 |
| Sundry receipts ... ... ... ... ... | 3,890 16 11 | 3,795 6 4 |
| Total ... ... ... ... | 1,011,543 14 5 | 991,075 8 7 |

EXPENDITURE.

| | £ s. d. | £ s. d. |
|---|---|---|
| Traffic expenses ... ... ... ... ... | 305,398 12 7 | 295,525 3 3 |
| General expenses... ... ... ... | 122,811 17 3 | 116,405 4 2 |
| Maintenance and repairs ... ... ... | 142,988 0 8 | 125,843 15 5 |
| Power expenses ... ... ... ... ... | 48,147 7 7 | 44,865 17 0 |
| | 619,346 18 1 | 582,639 19 10 |
| Balance carried to net revenue account ... | 392,196 16 4 | 408,435 8 9 |
| | 1,011,543 14 5 | 991,075 8 7 |

NET REVENUE ACCOUNT.

| | £ s. d. | £ s. d. |
|---|---|---|
| Balance from revenue account ... ... | 392,196 16 4 | 408,435 8 9 |
| Dumbarton tramways ... ... ... ... | 180 0 0 | 180 0 0 |
| Interest on investments ... ... ... | 58,451 0 10 | 49,591 16 4 |
| Total ... ... ... ... | £450,827 17 2 | £458,207 5 1 |

Appropriated as under:

| | Year to May 31, 1913. | Year to May 31, 1912. |
|---|---|---|
| | £ s. d | £ s. d. |
| Rent of Govan lines ... ... ... ... | 3,345 11 9 | 5,046 9 8 |
| Rent of Paisley lines ... ... ... ... | 5,493 14 4 | 5,271 1 0 |
| Interest on capital ... ... ... ... | 81,773 18 9 | 75,092 5 5 |
| Sinking fund ... ... ... ... ... | 97,077 1 6 | 93,863 10 6 |
| Income tax... ... ... ... ... ... | 13,388 0 1 | 13,027 10 4 |
| Parliamentary expenses ... ... ... | 984 14 1 | 135 0 2 |
| Renewal and depreciation ... ... ... | 215,756 16 4 | 213,703 17 3 |
| | 417,824 16 10 | 406,139 14 4 |
| Surplus to be handed over to Common Good ... ... ... ... ... ... | 33,003 0 4 | 52,067 10 9 |
| | £450,827 17 2 | £458,207 5 1 |

On the expenditure side the following increases were reported: Wages of motormen and conductors, £6,190; wages of cleaners, £3,145; local rates, £7,615; maintenance of track, £17,207; fuel for Pinkston, £2,826; interest on capital, £6,681; sinking fund, £3,214; and renewal and depreciation, £2,053; total, £48,931. On the revenue side the ordinary receipts show an increase of £20,468, and the interest on investments shows an increase of £8,859, which makes a total increase of £29,327. Deducting this sum from the above excess of expenditure of £48,931, a sum of a little over £19,000 is obtained, which represents the decrease in the surplus as compared with the surplus of the year 1911-12.

## PERSONAL.

**Inspector Howard,** of the Ashton Council Tramways, has been appointed to the position of chief inspector.

**Mr. T. R. Whitehead,** engineer and manager, Coventry Corporation tramways, has had his salary increased from £400 to £450.

**Mr. P. W. Bancroft,** chief clerk in the tramways department at Derby, has had his salary increased from £130 to £156 per annum.

**Mr. T. S. Field,** resident engineer to the Blackpool Corporation Tramways, has been voted an increase of £26 to his salary of £182.

**Mr. W. M. Arnot** has resigned his position as Australian manager for Siemens Brothers Dynamo Works, Limited, and intends to visit London at an early date.

**Scholey and Company, Limited.**—Mr. M. N. Jacks, director of Messrs. Humphreys, Limited, and Mr. J. Norman Ambler have joined the board of Messrs. Scholey and Company, Limited.

**Mr. W. H. Stradling,** an official of the London United Tramways, has resigned his appointment after eleven years' service, and on June 23 was the recipient of several handsome presents from the staff.

**Mr. W. Rutherford,** managing director of Dick, Kerr and Company, Limited, has been appointed a director of the Edinburgh and District Tramways Company to fill the vacancy created by the retirement of Sir Robert Maule.

**Dean Welldon,** of Manchester, is throwing open the grounds of the Deanery every Sunday afternoon for three months from 4 p.m to 6 p.m. to Manchester and Salford tramwaymen and their families. Tea is served on the lawn.

**Mr. W. Stone** has been appointed chief electrical engineer of the Victorian State Railways, and will take charge of the work of electrification of the Melbourne suburban lines in association with an expert to be sent out by Mr. C. H. Merz.

**Mr. Cyril Clarke,** principal assistant in the tramways department at Birkenhead, has been appointed acting tramways manager until the end of the year. An amendment in favour of advertising for a manager was defeated, only six members of the Council supporting it.

**Mr. W. C. Murray,** traffic inspector, who has been associated with the New South Wales tramway department since its inception in 1880, is retiring after 33 years' service. Since 1889 he has been at Newcastle. He has been granted four months' extended leave from April 13.

**Mr. W. P. Burton,** who has been invited by Sir Thomas Lipton to command the new America Cup Challenger, is the vice-chairman of the Ipswich Electric Supply and Tramways Committee. He is also the Master of the East Suffolk Foxhounds and Master of the Staghounds.

**Mr. G. W. Humphreys,** chief engineer to the London County Council, has been nominated as a representative of the Council on the Engineering Standards Committee, in the place of Sir M. Fitzmaurice, late chief engineer, who has resigned his membership.

**Mr. P. R. Collings,** of the cashier's office, Portsmouth Corporation Tramways, has been presented with a case of cutlery and carvers on the occasion of his marriage. Messrs. Cook, Trowbridge, and Gordon Bailey spoke on behalf of the cashiers, inspectors, and other municipal departments.

**Messrs. J. M. McElroy and H. Mattinson,** general manager and permanent way engineer respectively of the Manchester tramways, who on May 17 left England on a visit to America to study tramways and transportation methods, returned to Manchester during the first week in July.

**Mr. S. T. Allen,** the new borough electrical engineer and manager of the Wolverhampton electricity department, has been presented with a gold watch and an oxidised silver inkstand by his late colleagues and a number of members of Carlisle Corporation. The Mayor, in handing the gifts to Mr. Allen, observed that he had transformed the electrical undertaking into a profitable one.

**Ilford Traffic Superintendent.**—On the ground of economy Ilford Urban Council in February last decided that the post of traffic superintendent in the tramways department should be abolished. On June 10, on the recommendation of the Tramways Committee, the authority rescinded the resolution, and decided that Mr. Woolstencroft should retain the position at a salary of £156.

**Dinner to Colonel Sir A. Yorke.**—It has been arranged by the two Tramway Associations to give a complimentary dinner to Colonel Sir Arthur Yorke, K.C.B., on the occasion of his retirement from the Board of Trade in July. The dinner will be held in the Savoy Hotel, London, on July 18, when the chair will be taken by Viscount Chilston, president of the Tramways and Light Railways Association.

**Mr. R. S. Pilcher,** general manager, Aberdeen Corporation Tramways, is recommended by the Tramways Committee for an increase of his salary from £400 to £450, with another increase of £50 in two

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annual increments of £25, bringing the total salary to £500. The committee expressed appreciation of the efficient services given by Mr. Pilcher, and they recognised the economies he had effected and the good condition of the rolling stock and property of the department.

**Mr. H. M. Sayers,** who was cordially welcomed by many friends at the Congress of the Tramways and Light Railway Association, is in England for a few weeks' holiday. Since he went out to Santos, Brazil, as chief electrical engineer of the City of Santos Improvements Company, Limited, many important extensions and improvements have been carried out, and the work was often undertaken at high pressure under conditions that constituted a heavy tax upon those concerned Mr. Sayers returns, however, in excellent health.

**London County Council Central Car Repair Depot Superintendency.**—Fifty-eight applications were received by the London County Council in response to an advertisement for a superintendent of the central car repair depot, at £300 a year. After examining the applications and testimonials and interviewing several of the candidates the committee were of opinion that is was not desirable that a permanent appointment should be made at the present time. They had accordingly decided that a superintendent should be appointed temporarily, and the chief officer of tramways proposed to engage one of the candidates.

**Mr. A. O. Kolkhorst,** who has entered into partnership with Mr. R. W. Weekes, Maxwell House, Arundel Street, Strand, W.C., recently returned from Chili, where for three years he was general manager of the Chilian Electric Tramways and Light Company, Santiago, and at the same time general manager of the Valparaiso Electric Tramways and Light Company. The whole of the electric tramways in Valparaiso and the lighting and power plants were carried out under his direction and supervision, and he had continuous control of this undertaking from 1903 to 1912. The capital outlay on these schemes was £3,500,000.

**Mr. J. B. Hamilton,** general manager of the Leeds Corporation Tramways, was stated in a report presented by the Tramways Committee to the City Council to have been granted permission by Alderman Tetley, the chairman of the committee, to render assistance to Southport, West Bromwich, Nottingham, and the London County Council in connection with applications for Parliamentary powers. A councillor rose to discuss this matter, but Alderman Willey stated that Mr. Hamilton's agreement provided for work of this kind being undertaken by him, after permission by the chairman. The town clerk upheld this statement, and added that the conduct of the chairman in giving permission could not be discussed.

**Mr. J. McKellar,** who read a paper on the Newcastle-on-Tyne tramway extensions at a recent meeting of the Municipal and County Engineers' Institute, was first engaged in the municipal engineers' department at Paisley, where he was articled. In 1897 he entered the service of the Glasgow Corporation, and was engaged on the construction of 40 miles of electric tramways, and also on the erection of the Pinkston power-station. Mr. McKellar became chief assistant to the resident engineer of the Newcastle tramways in 1900, and was afterwards transferred to the staff of the city engineer, being subsequently engaged on various tramways and other works in Newcastle, including many Parliamentary schemes.

**Mr. A. A. Day's** resignation of the appointments of tramways manager and electrical engineer at Bolton was accepted by the Town Council on June 7. Alderman Miles, chairman of the Tramways Committee, said if he ventured the opinion that Mr. Day's serious illness had been brought about through an excessive anxiety and study in carrying out his work he would not be far wrong. Mr. Day practically took no recreation, for which Alderman Miles was sorry, because if he had this would perhaps not have happened. Alderman Nicholson remarked that it was lamentable that on the eve of commencing a big undertaking on which Mr. Day had been engaged night and day for a long time he should be struck down. Mr. Day was formerly chief assistant electrical engineer of Manchester, and succeeded Mr. Ellis, now of Cardiff, as Bolton borough electrical engineer in 1900. He was appointed tramways manager in 1904. The salaries for the dual positions amount to £750 per annum.

**Tramway Committeemen** who are also associated with the general electrical undertakings of their respective Corporations, have had a busy time recently. Aldermen F. Smith and Major Clarke, who are respectively chairman and vice-chairman of the Liverpool Electricity and Tramways Committee, and take a deep interest in the working of the departments for which the committee are responsible, attended the congress of the Tramways and Light Railways Association, at Blackpool, and the following week they devoted to the Municipal Electrical Association. In brief intervals they were able to attend various local conferences and committee meetings at Liverpool Both are strongly of opinion that associations such as those referred to are of much value, not only to industry at large, but particularly to members of Councils, who have to decide on important matters of policy involved in new departures.

**A Presentation at Newcastle.**—Councillor Rodgers, chairman of the Tramways Committee, at the opening of Heaton extension of the city tramways, was presented by the Lord Mayor (Ald. Weidner), on behalf of the Tramways Committee, with a souvenir of the event in the form of a handsome gold watch and chain. His lordship, who was the pioneer of the movement for municipalising the tramways, paid a tribute to the work of the first chairman, Ald. Cail, and of his successor, Ald. Sir Joseph Ellis Following Sir Joseph, Mr. Rodgers had proved himself to be a valuable asset. The Lord Mayor also complimented Mr. Ernest Hatton, the general manager, and the staff on their work. Sir Joseph Ellis proposed the health of the Lord Mayor, with a tribute to the work done by Councillor Mayne, the vice-chairman, and Mr. Hatton, the manager. The tramways had done something to make the lives of the citizens brighter and happier. In thanking the members for the presentation, Councillor Rodgers remarked that the usual recognition of the services of a public man was satire, sneers, and criticism; but he was glad to see that for once in a way public labours had been appreciated.

**Mr. W. Wyld,** late borough electrical engineer and tramways manager at Birkenhead, and now electrical engineer to Hampstead Council, has been presented by the Birkenhead tramway staff and employees with a silver tea service, with tray, as a token of their esteem. Mr. J. Dudleston (traffic superintendent) presided, and said there was a unanimous wish that some suitable recognition should be made by the staff of the gentlemanly and courteous treatment they had always received from him. The fact that over two hundred were present was an indication of his fair dealing with the men. Mr. Chadwick (rolling stock superintendent), Inspector Godding, Mr. J. Gunn (on behalf of the Tramway Workers' Association), Conductor Wallace, Mr. S. Edge, Mr. Evans (shedmen), and others testified to the esteem in which Mr. Wyld was held. Mr. Gunn observing that there were times when they had thought they had been hardly punished, but they could not fail to come to the conclusion that Mr. Wyld had dealt fairly and squarely with them. Mr. Cyril Clarke, the newly-appointed manager, handed the tea service to Mr. Wyld, and referred to his many kindly acts, which had been performed in a most unostentatious manner. Mr. Wyld, in reply, thanked the staff and employees for their kindness, and said that after he appeared before the Hampstead Electricity Committee one of the members remarked to him that he had heard he was not a slave-driver. He never had been a slave-driver, and he never would be. He had always found that the best work was done by men who were asked to do it in a proper manner. It only remained for them to stand by Mr. Clarke as they had stood by him, and the continued success of the tramways was assured. From the employees of the electricity department, Mr. Wyld has received a barometer, Mr. Shallcross, the electrical engineer, making the presentation. The chief officers of the Corporation gave their late colleague a silver salver.

**Mr. H. E. Blain** has entered upon his appointment at the head office of the London Underground Railways. It is understood that among other duties, Mr. Blain will deal with the purchase of material and supplies, a department which, in view of rapidly increasing demands, is becoming one of very great importance to the undertaking. In accepting with regret his resignation as manager of the West Ham Corporation Tramways, the Tramways Committee wished him every success and prosperity in his future career. Mr. Blain went to West Ham from Liverpool in 1903, and organised the tramways. In order to place on permanent record the Council's high appreciation of Mr. Blain's work, not only in connection with his 10 years' management of the West Ham tramways undertaking, but also in connection with municipal tramways throughout the United Kingdom, a testimonial on vellum, under the Corporate seal, is to be presented to him. At the June meeting of the Council, Alderman Littler, chairman of the committee, spoke in eulogistic terms of Mr. Blain's work, and the manner in which he had suppressed the bogus accident claim-mongers. He had built up a bureau of information with regard to this type of individual, which had been most useful to the whole of the tramway systems in that neighbourhood. It was also very largely due to the energy of Mr. Blain that they owed the inter-running arrangements between West Ham and the London and other surrounding authorities. —On appearing for the last time to support a number of tramway summonses at West Ham Police Court, Mr. Blain expressed to Mr. R. A. Gillespie, the stipendiary magistrate, his thanks for the courtesy and consideration he had received at his worship's hands during a term of nearly 10 years. Mr. Gillespie replied that he was sorry to hear they were going to lose Mr. Blain. They had always met in a perfectly friendly and cordial manner, and he hoped that he would get on equally well with Mr. Blain's successor.—On July 4 Mr. Blain was entertained to dinner by the members of the Metropolitan Association of Electric Tramway Managers. Mr. Blain has always taken a deep interest in the affairs of the Municipal Tramways Association, of which he was president in 1912, when one of the Association's most successful Conferences was held in London.

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## TRAMWAY AND LIGHT RAILWAY NOTES.

**BIRMINGHAM.**—Consideration was given on July 1 by Birmingham Corporation to the Tramways Committee's scheme for the linking up of the various tramway routes by means of lines through the central area of the city. The scheme was divided into 13 sections. Two parts met with the disapproval of the majority of the members, the proposal to link up Broad Street with Colmore Row *via* Victoria Square being referred back to the Tramways Committee to prepare a scheme that will avoid Victoria Square, and the suggestion to connect Navigation Street with Corporation Street *via* Stephenson Street being rejected by a large majority. All the other proposals, including that for a double line of tramways along Broad Street, were approved. Councillor Harrison Barrow, chairman of the committee, emphasised the dislike the public had to being taken round back-street routes. A minute or two, he said, made a great deal of difference to people travelling on the cars, and as they had found in the case of the Ladywood terminus, often turned profit into loss. Councillors Neville Chamberlain and Combridge, the chief opponents, urged that the tramways could only go on making money whilst they had a monopoly of the routes. Their only security was whether the Watch Committee would or would not give competitors powers to run along the streets. Councillor Harrison Barrow declined to enter into a discussion on the merits of motor 'buses and tramways, but pointed out that the returns of the London General Omnibus Company for the six months ended December 31 showed that their expenses ratio had gone up from 81 per cent. to 92 per cent., so that the motor omnibuses were not having it all their own way in London.

**BURNLEY.**—It has been decided to remove the centre poles and to substitute wire suspension with side poles, in accordance with the practice on other tramways. The work will be proceeded with as soon as convenient. During the past year 456 hammered joints have been filled in by the oxy-hydrogen process at an average cost of 13s. 6d. per joint. The work has been done during the night, and so far appears, the general manager states, to offer a satisfactory solution of a common difficulty.

**LONDON.**—At the suggestion of the Highways Committee the County Council have withdrawn the railless trolley car proposals from the Council's Tramways Bill, in consequence of the House of Commons having adopted an instruction to the Committee on the bill to insert a provision making the erection of the overhead equipment subject to the provisions of section 23 of the London County Tramways (Electrical Power) Act of 1900. That section provided that the Council should not apply the overhead system of traction to tramways without the consent of the road authority. The Highways Committee propose to reconsider the whole matter and report further.—The West London stipendiary magistrate on May 22 dismissed a summons preferred by the police against a tramcar driver for failing to bring his car to a standstill to avoid impending danger. The magistrate was of opinion that the case ought not to have been brought forward, and he awarded a guinea costs. Reporting on the matter on June 10, the Highways Committee said this was the first occasion on which the Council had been successful in obtaining costs against the police. Since January 1 last 19 summonses out of a total of 29 taken out by the police against the Council's motormen for failing to stop to avoid impending danger, endangering the safety of persons, causing hurt, and wanton and negligent driving had been dismissed.—By 2,339 votes to 1,210 the tramway employees of the County Council have agreed to amendments of the regulations governing the conciliation board. Under the amended rules, which were put forward on behalf of the employees, the central board comes to an end, but four boards for various grades will be continued.

**MANCHESTER.**—Under the latest linking up of the tramways on the south side of the city, it is possible to journey from Piccadilly to the Palatine Road terminus and return to the city by circular route along the new Burton Road, Barlow Moor Road route, past the Southern Cemetery, and then by way of Chorlton, Brook's Bar, and the city, this being in all a ten miles circular route. Along Slade Lane as far as West Point a new track is being laid, and in time it will continue along Moseley Road and Wilbraham Road, to Chorlton. By the completion of that route it will be possible to reach Chorlton by car from four different directions.

**NEWCASTLE-ON-TYNE.**—The opening took place on June 6 of the extension of the tramways from Jesmond Road to the Heaton terminus of the Tyneside Tramways Company. The Lord Mayor (Ald. Weidner) said he felt assured that the latest additions to the magnificent service that they already enjoyed would maintain its high standard. The tramways had developed the outlying districts, and the relief afforded to the rates had not been at the expense of adequate provision for contingencies. Councillor Rodgers, chairman of the Tramways Committee, stated that last year they carried 52,204,974 people, the whole population of Newcastle 209 times in the year, or four times in the week. No other town but Glasgow, with its congested population, did better. The fare per passenger was only a penny and a fraction. As an example of the profits of running through services, he said the extension of the Benwell service increased returns from £280 per week to £380 and required two more cars.


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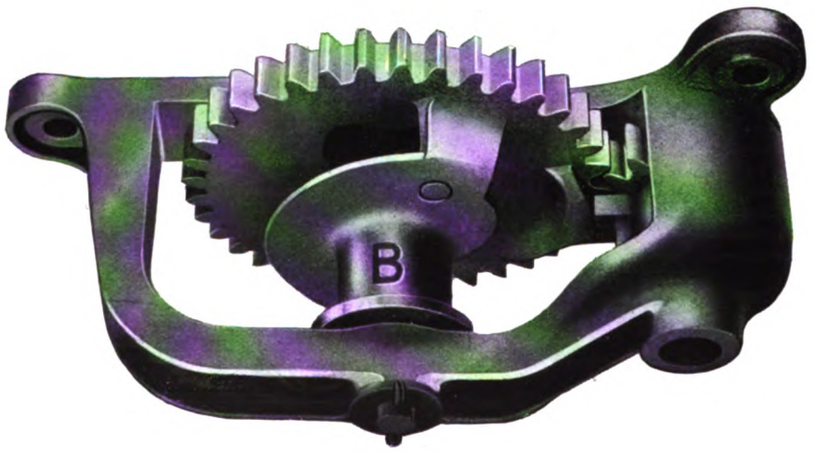


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II


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**OXFORD.**—Sir Alex. Kennedy has reported to Oxford Council that he sees no reason why the National Electric Construction Company's scheme for running petrol-electric cars in the centre of the city and on Magdala Bridge, in conjunction with cars elsewhere on the overhead system, should not work satisfactorily. The Tramways Committee have been requested by the Council to report on the matter before July 13.

**WEST BROMWICH.**—An attempt by the Home Office to place their London fetters upon a provincial tramway has been defeated. If there is one cause of complaint more than another among tramway passengers in boroughs situated in the outer districts of London, it is that they have to journey to Scotland Yard to recover any article they leave in the cars if it has been removed from a tramway depôt. When the West Bromwich Corporation Bill was before a Committee of the House of Commons in June, the Home Office raised objections to the proposal to establish a lost property office in connection with the tramways, and to have a sale once in six months for the disposal of such property as had not been claimed. The Committee, however, concluded that such a provision was a reasonable one, and likely to be of general advantage. The clause was therefore agreed to.

## PATENT LIST.

### Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

### APPLICATIONS.

### Applications for Letters Patent have been filed:

12,406 Means for the regulation or control of railway traffic—H. von Kramer.
12,473 Lubrication of the wheels and axles of railway and tramway vehicles—J. Abbott.
12,599 Operation of railway points—A. T. Blackhall and S. Hutt.
12,644 Railway sleepers—J. S. Todd.
12,674 Automatic brake slack adjusters for railway carriages, etc.—Birmingham Railway Carriage and Wagon Company, and E. O. Hill.
12,692 Guards or fenders for motor road vehicles—F. Bloomfield.
12,723 Testing insultation—Evershed and Vignoles, Ltd., and S. Evershed.
12,797 Rail fasteners—S. C. Collins.
12,841 Power transmission and control apparatus on motor vehicles—J. G. P. Thomas and Thomas Transmission, Ltd.
12,863 Life-guards for the front of motor vehicles—E. Hall.
12,885 Device for securing rails to ties—E. J. Rosencrans and H. Sanderson.
12,923 Wheel guards and obstruction removers for mechanically propelled road vehicles—M. van Gelder.
12,954 Life-guard for mechanically propelled vehicles—W. J. Palmer.
12,973 Guards for motor-driven vehicles—A. F. Davis.
13,022 Life-guard for motor road vehicles—J. Swift and E. Swift.
13,064 Electric railway signal relay to be operated by alternating currents—A. H. Johnson and W. J. Thorrowgood.
13,078 Automatically reversing overhead collector for electric trains—P. Alexander and R. F. Stedman.
13,093 Safety device and signals for electric cars, motor omnibuses, etc.—E. G. H. Pyle and H. Pyle.
13,135 Dynamic brakes—J. Klinkenberg.
13,147 Wheel guard—C. Lewin.
13,154 Life-saving guard for motor vehicles—D. Maggiora.
13,166 Obstruction remover and wheel guard—C. B. Voisey.
13,202 Railway signalling devices—E. Day and P. Kühn.
13,242 and 13,243 Electrical train-control system—W. B. Murray.
13,278 Life-guard—D. Sullivan.
13,392 Life-guard for motor traffic—G. P. Abrahams.
13,396 Railway crossing—M. E. Harrison.
13,421 Device for securing railroad rails to ties—E. J. Rosencrans and H. Sanderson.
13,428 Trolley heads for electrically-propelled vehicles—J. T. Mayor.
13,495 Safety guards for motor omnibuses—A. W. Gamlen.
13,548 Axle trucks for railway and tramway vehicles—E. Peckham and S. Thomas.
13,564 Life-saving catcher for trams, cars, etc., tracked or trackless—C. Yeoman.
13,656 Systems of electrical distribution—British Thomson-Houston Co., Ltd. (*General Electric Co.*)
13,886 Apparatus for removing obstruction and preventing accident or loss of life by electric trams and railways, etc.—W. T. Harper.
13,820 Electrical connection devices for railway vehicles—L. Boirault.
13,821 Life-guards for self-propelled road vehicles—F. C. Andrew.
13,832 Railway train brakes and signalling—A. G. Taylor and F. Herbert.
13,868 Life-guard for motor omnibuses—F. H. Parker and J. Malam.
13,872 Life-saving guards for motor vehicles—J. Watt and H. P. Patten.
13,887 Speed controllers—T. Douglas.
13,943 Electrical conductors—F. Eastwood.
13,958 Motor fuel economiser—A. Gibbs.
13,972 Guards for motor vehicles—W. Jones.
14,001 Fluid pressure brakes—W. V. Turner and P. H. Donovan.
14,002 Fluid pressure braking apparatus—W. V. Turner.
14,012 Method of forming parallel faces on the ends of rails and other objects to be butt welded—Th. Goldschmidt Akt. Ges.
14,020 Double-decked cars for railways and tramways—L. Spangler.
14,024 Rail joints—O. Allen, Junr.
14,039 Bogie truck for railway carriages—F. H. Addis.
14,047 Life-guards for road vehicles—R. Garret.
14,104 Life-guards for motor omnibuses—W. E. Cocks.
14,177 Apparatus for preventing the overrunning of signals by railway trains—H. G. Wainscott, E. Wainscott, T. Mahon, and S. Yates.
14,200 Life-saving guard for motor omnibuses—P. Beston.
14,202 Motor vehicle life-guard—S. A. Goss.
14,243 Mounting motors on electric tramcars or other rail carriages to prevent side swing—I. Bulfin.

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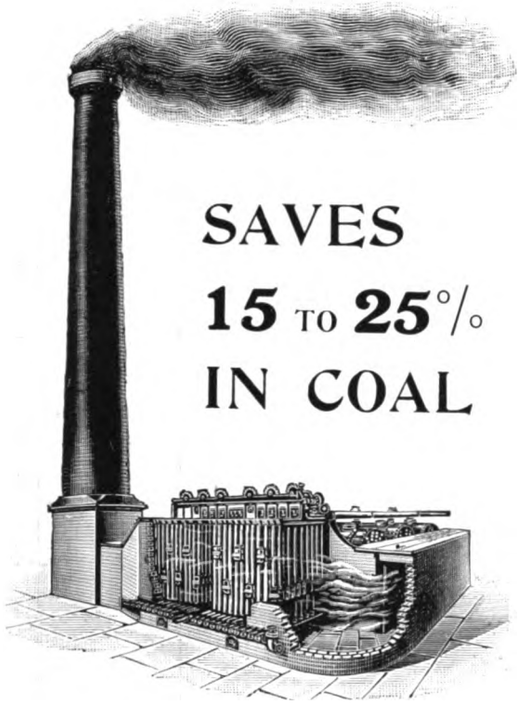

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14,349 Life-guard for motor omnibuses—E. L. N. Karslake.
14,362 Car coupling—O. Rison.
14,415 Guards for use in connection with motor road vehicles—C. Fenwick.

## Specifications Published.

1912.

2,957 Electrical railway systems—Stuart.
10,417 Railway and tramway systems - Hayward.
21,755 Railway sleepers—Winsall and O'Neill.
10,983 Device for use in displacing rail tracks laterally—Kleber.
14,677 Wedges or keys for railway lines—Reed.
3,828 Railway safe running devices—Angus.
15,509 Adjustable bolster chairs and clamps for the switch blades of railway points—Williams.
17,193 Apparatus for the adjustment of the gauge of rails—Williams.
19,517 Means for operating tramway points -Coulcombe.
33,932 Life-guards for vehicles—Seal.
12,184 Driving gear for mechanically-propelled tramcars—Nelson.
12,329 Axle trucks for railway and tramway vehicles and locomotives—Warner International and Overseas Engineering Co., and Hour.
20,942 Suspension of rail car bodies - Thomas.

1913.

3,588 Railway signalling and apparatus therefor—Stuart.
990 Railway chair keys—Stephenson.
1,080 Automatic couplings for railway vehicles—Paynter.
3,936 Sanding apparatus for railway and tramway vehicles—Cia. Italiana Westinghouse dei Freni.
5,916 Railway safe-running devices—Angus.
5,918 Apparatus for operating and controlling railway point locking devices—Angus.
6,144 Buffers for railway and tramway vehicles—Lofthouse.
506 Street indicators for tramway vehicles—Travers.
4,068 Vehicle brakes—Hostetler.

**Directories of Electric Tramways and Railways** will be found on pages xxv.–xxxiv. of this issue.

# TRAFFIC RETURNS.

## TRAMWAYS AND OMNIBUSES.

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. June 1. | June 8. | June 15. | June 22. | 1913. WEEKS ENDING. May 31. | June 7. | June 14. | June 21. | AGGREGATE. Wks. | 1913. | Increase or Decrease. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Aberdeen Corporation | 1,953 | (11 days) | 2,400 | 1,543 | 2,481 | (11 days) | 2,454 | 1,710 | 23 | 4,314 | + 222 |
| Ayr Corporation | 314 | 307 | 333 | 351 | 289 | 364 | 359 | 391 | 5 | 1,801 | + 73 |
| Bath Electric | 2,111 | 886 | 947 | 906 | 1,366 | 1,202 | 984 | 1,197 | 25 | 20,977 | + 152 |
| Birmingham Corporation | 12,124 | 10,263 | 10,554 | 10,625 | 11,691 | 11,543 | 11,442 | 11,574 | 12 | 136,997 | + 9,862 |
| Blackburn Corporation | 1,669 | 1,095 | 1,164 | 1,191 | 1,320 | 1,333 | 1,294 | 1,445 | 12 | 15,576 | + 1,020 |
| Blackpool and Fleetwood | 1,945 | 823 | 606 | 679 | 509 | 796 | 631 | 861 | 25 | 12,404 | + 807 |
| Blackpool Corporation | 3,005 | 2,517 | 1,121 | 1,160 | 963 | 1,555 | 1,099 | 1,435 | 11½ | 14,643 | + 379 |
| Bolton Corporation | 2,852 | 2,597 | 2,570 | 2,676 | 2,703 | 2,731 | 2,880 | 2,760 | 12 | 32,242 | + 1,169 |
| Bournemouth Corporation | 1,772 | 1,694 | 1,724 | 1,789 | 1,959 | 1,900 | 2,045 | 2,000 | 12 | 24,415 | + 1,930 |
| Bradford Corporation | 7,184 | 5,124 | 5,733 | 5,566 | 6,089 | 6,123 | 6,216 | 6,177 | 12 | 70,623 | + 2,823 |
| Brighton Corporation | 1,226 | 929 | 993 | 1,018 | 1,059 | 1,008 | 1,064 | 1,097 | 12 | 11,763 | - 161 |
| Bristol | 9,703 | 7,098 | 6,857 | 6,830 | 8,585 | 8,373 | 7,867 | 8,415 | 25 | 180,291 | + 19,242 |
| British Elec. Trac. Co's. Undertakings: | | | | | | | | | | | |
| Airdrie | 316 | 301 | 310 | 313 | 351 | 382 | 365 | 412 | 25 | 8,072 | + 1,082 |
| Barnsley | 229 | 171 | 191 | 192 | 325 | 335 | 344 | 363 | 25 | 6,078 | + 2,013 |
| Barrow | 549 | 397 | 398 | 399 | 406 | 460 | 418 | 474 | 25 | 9,224 | + 595 |
| Birmingham and Mid. Joint Com. | | | | | | | | | | | |
| Birmingham and Midland | 1,431 | 888 | 917 | 927 | 989 | 976 | 962 | 989 | 25 | 25,029 | + 1,304 |
| Dudley-Stourbridge | 1,622 | 879 | 851 | 855 | 1,031 | 973 | 986 | 1,015 | 25 | 22,396 | + 1,528 |
| South Staffordshire | 1,417 | 869 | 913 | 906 | 975 | 941 | 943 | 983 | 25 | 24,717 | + 2,188 |
| Wolverhampton District | 862 | 437 | 464 | 464 | 506 | 498 | 490 | 513 | 25 | 12,572 | + 1,029 |
| Devonport | 670 | 538 | 646 | 522 | 554 | 654 | 530 | 575 | 25 | 12,904 | - 143 |
| Gateshead | 1,147 | 1,046 | 1,060 | 1,067 | 1,374 | 1,430 | 1,363 | 1,435 | 25 | 28,519 | + 3,906 |
| Gravesend and Northfleet | 301 | 198 | 200 | 190 | 248 | 250 | 238 | 251 | 25 | 5,447 | + 475 |
| Greenock-Port Glasgow | 907 | 818 | 890 | 877 | 934 | 942 | 921 | 1,059 | 25 | 19,992 | + 1,070 |
| Jarrow | 206 | 126 | 143 | 140 | 158 | 154 | 144 | 161 | 25 | 3,367 | + 162 |
| Kidderminster | 314 | 100 | 112 | 118 | 127 | 123 | 122 | 148 | 25 | 2,665 | + 50 |
| Merthyr | 300 | 196 | 190 | 196 | 220 | 218 | 216 | 233 | 25 | 5,277 | + 778 |
| Metropolitan Electric | 11,820 | 8,674 | 9,331 | 9,248 | 10,136 | 9,508 | 9,306 | 10,055 | 25 | 218,941 | + 4,639 |
| Middleton | 456 | 432 | 349 | 347 | 378 | 390 | 368 | 440 | 25 | 8,350 | + 489 |
| Oldham-Ashton | 781 | 707 | 617 | 598 | 632 | 648 | 621 | 687 | 25 | 14,959 | + 243 |
| Peterborough | 183 | 132 | 136 | 140 | 242 | 205 | 192 | 219 | 25 | 3,748 | + 748 |
| Potteries | 2,266 | 1,908 | 1,925 | 1,962 | 2,042 | 2,070 | 2,072 | 2,111 | 25 | 51,584 | + 7,171 |
| Rotherham | 190 | 257 | 276 | 301 | 171 | 241 | 259 | 415 | 25 | 3,140 | + 330 |
| Sheerness | 64 | 53 | 62 | 52 | 57 | 60 | 52 | 61 | 25 | 1,206 | + 85 |
| South Metropolitan | 1,307 | 957 | 894 | 874 | 983 | 1,074 | 891 | 973 | 25 | 19,814 | - 392 |
| Southport | 520 | 355 | 321 | 320 | 342 | 350 | 324 | 367 | 25 | 7,115 | + 380 |
| Swansea | 1,657 | 1,077 | 1,093 | 1,137 | 1,287 | 1,281 | 1,258 | 1,433 | 25 | 29,870 | + 2,924 |
| Taunton | 64 | 50 | 45 | 51 | 47 | 47 | 46 | 51 | 25 | 1,142 | + 98 |
| Tynemouth | 560 | 206 | 249 | 270 | 268 | 308 | 261 | 335 | 25 | 5,089 | + 403 |
| Weston-super-Mare | 392 | 131 | 163 | 179 | 148 | 168 | 174 | 251 | 25 | 2,143 | + 309 |
| Worcester | 441 | 322 | 328 | 306 | 317 | 304 | 346 | 381 | 25 | 6,922 | + 251 |
| Wrexham and District | 147 | 109 | 108 | 112 | 130 | 129 | 130 | 147 | 25 | 2,887 | + 274 |
| Yorks. (Woollen) District | 1,465 | 1,016 | 1,149 | 1,118 | 1,196 | 1,166 | 1,181 | 1,228 | 25 | 28,038 | + 2,167 |

*(Continued on page 52.)*

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## TRAFFIC RETURNS—Tramways and Omnibuses—*continued.*

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | | 1913. WEEKS ENDING. | | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | June 1. | June 8. | June 15. | June 22. | | May 31. | June 7. | June 14. | June 21. | | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | | £ | £ | £ | £ | | | £ | £ |
| Burnley Corporation | 1,677 | 1,386 | 1,438 | 1,443 | | 1,649 | 1,693 | 1,626 | 1,646 | | 12 | 19,848 | + 2,029 |
| Burton-on-Trent Corporation | 315 | 283 | 272 | 279 | | 294 | 274 | 318 | 291 | | 12 | 3,387 | + 139 |
| Bury Corporation | 1,493 | 1,270 | 1,235 | 1,357 | | 1,342 | 1,395 | 1,417 | 1,377 | | 13 | 16,237 | + 174 |
| Cardiff Corporation | 2,929 | 2,386 | 2,347 | 2,497 | | 2,652 | 2,690 | 2,694 | ... | | 12 | — | — |
| Chatham and District | 1,078 | 855 | 855 | 898 | | 952 | 1,022 | 919 | 1,012 | | 24 | 21,117 | + 884 |
| Chesterfield Corporation | 304 | 212 | 218 | 218 | | 252 | 254 | 246 | 259 | | 11 | 2,877 | + 430 |
| Colne and Trawden | 351 | 255 | 256 | 255 | | 299 | 309 | 295 | 294 | | 25 | 6,440 | + 294 |
| Cork Electric | 560 | 538 | 528 | 534 | | 528 | 532 | 515 | 559 | | 24 | 11,432 | - 224 |
| Croydon Corporation | 2,349 | 1,808 | 1,968 | 1,822 | | 1,833 | 1,758 | 1,624 | ... | | 11 | — | — |
| Darlington Corporation | 252 | 225 | 234 | 236 | | 251 | 258 | 247 | 250 | | 12 | 2,956 | + 325 |
| Derby Corporation | 1,186 | 868 | 894 | 930 | | 1,004 | 987 | 1,002 | 1,069 | | 12 | 11,633 | + 1,721 |
| Dover Corporation | 305 | 232 | 251 | 251 | | 253 | 241 | 239 | 263 | | 12 | 2,723 | - 99 |
| Dublin and Lucan | 257 | 143 | 158 | 166 | | 154 | 180 | 168 | 175 | | 25 | 3,292 | - 2 |
| Dublin United | 7,281 | 5,664 | 6,086 | 6,265 | | 6,661 | 6,527 | 6,078 | 7,312 | | 25 | 141,706 | + 1,974 |
| Dundee City | 1,228 | 1,167 | 1,186 | 1,215 | | 1,302 | 1,364 | 1,298 | 1,335 | | 5 | 6,597 | + 615 |
| East Ham Corporation | 1,192 | 996 | 1,003 | 1,047 | | 1,020 | 1,013 | 990 | 1,040 | | 12 | 12,747 | + 259 |
| Exeter Corporation | 432 | 342 | 328 | 340 | | 356 | 343 | 348 | 355 | | 12 | 3,875 | Nil. |
| Glasgow Corporation | 20,135 | 18,643 | 19,467 | 19,184 | | 21,127 | 21,033 | 20,845 | 21,164 | | 3 | 63,042 | + 5,562 |
| Glossop (Urban Elec. Supply Co.) | 133 | 127 | 125 | 126 | | 127 | 129 | 129 | 146 | | 25 | 3,163 | + 469 |
| Halifax Corporation | 3,140 | 1,895 | 1,974 | 1,991 | | 2,169 | 2,253 | 2,054 | 2,226 | | 11 | 23,554 | - 395 |
| Hastings and District | 1,316 | 894 | 942 | 986 | | 1,054 | 997 | 910 | 1,096 | | 25 | 21,674 | + 1,173 |
| Huddersfield Corporation | 2,654 | 1,904 | 2,015 | 1,968 | | 2,193 | 2,186 | 2,127 | 2,278 | | 12 | 25,380 | + 1,498 |
| Hull Corporation | 3,084 | 2,806 | 2,955 | 2,887 | | 3,078 | 3,099 | 3,080 | 3,062 | | 12 | 36,178 | + 2,109 |
| Ilford U.D. Council | 698 | 535 | 542 | 536 | | 479 | 469 | 450 | 474 | | 12 | 5,468 | - 950 |
| Ilkeston Corporation | 107 | 113 | 118 | 129 | | 140 | 134 | 142 | ... | | — | — | — |
| Ipswich Corporation | 567 | 429 | 464 | 471 | | 465 | 467 | 454 | 495 | | 12 | 5,176 | + 23 |
| Isle of Thanet | 953 | 563 | 736 | 837 | | 662 | 694 | 741 | 908 | | 38 | 15,258 | + 285 |
| Kilmarnock Corporation | 159 | 150 | 164 | 162 | | 175 | 167 | 176 | 176 | | 5 | 970 | + 65 |
| Lanarkshire | 1,499 | 1,470 | 1,484 | 1,481 | | 1,725 | 1,754 | 1,729 | 1,785 | | 24 | 39,686 | + 5,640 |
| Lancashire United | 1,719 | 1,508 | 1,351 | 1,341 | | 1,617 | 1,547 | 1,494 | 1,661 | | 24 | 35,028 | + 3,466 |
| Leeds City | 9,612 | 7,479 | 7,933 | 8,065 | | 8,621 | 8,663 | 8,298 | 8,790 | | 12 | 98,428 | + 7,249 |
| Leicester Corporation | 3,237 | 2,514 | 2,613 | 2,727 | | 3,039 | 2,970 | 2,881 | 3,001 | | 25 | 68,206 | + 7,123 |
| Leith Corporation | 699 | 626 | 690 | 674 | | 731 | 740 | 724 | 766 | | 5 | 3,929 | + 326 |
| Liverpool Corporation | 13,374 | 11,840 | 12,122 | 12,234 | | 13,193 | 13,281 | 13,061 | 13,510 | | 24½ | 306,491 | + 17,811 |
| Llandudno and Colwyn Bay | 627 | 373 | 297 | 350 | | 263 | 272 | 332 | 380 | | 29 | 6,444 | + 672 |
| London County Council | 47,649 | 42,753 | 43,106 | 43,580 | | 42,630 | 42,487 | 41,996 | 42,998 | | 11 | 476,794 | - 19,372 |
| London General Omnibus | 59,791 | 52,282 | 54,830 | 57,581 | | 74,553 | 71,898 | 67,716 | 74,515 | | 25 | 1,503,300 | + 348,016 |
| London United | 10,263 | 6,223 | 6,434 | 6,607 | | 7,890 | 7,028 | 6,521 | 7,412 | | 25 | 147,132 | - 2,426 |
| Lowestoft Corporation | 211 | 153 | 153 | 161 | | 183 | 189 | 184 | 199 | | 37 | 6,167 | + 297 |
| Maidstone Corporation | 216 | 181 | 193 | 187 | | 205 | 212 | 196 | 210 | | 12 | 2,327 | + 148 |
| Manchester Corporation | 20,123 | 16,138 | 16,532 | 17,032 | | 17,908 | 18,307 | 17,785 | 18,446 | | 12 | 208,603 | + 10,061 |
| Nelson Corporation | 221 | 182 | 191 | 208 | | 206 | 210 | 204 | 219 | | 12 | 2,459 | + 4 |
| Newcastle-on-Tyne Corporation | 4,530 | 4,208 | 4,357 | 4,411 | | 4,645 | 4,792 | 4,747 | 4,852 | | 12 | 54,703 | + 4,081 |
| Newport (Mon.) Corporation | 876 | 696 | 693 | 721 | | 731 | 718 | 742 | 748 | | 12 | 8,709 | + 558 |
| New St. Helens and District | 1,207 | 719 | 702 | 744 | | 843 | 905 | 857 | 927 | | 51 | 38,698 | + 1,856 |
| Northampton Corporation | 794 | 529 | 526 | 555 | | 626 | 573 | 575 | 605 | | 11½ | 6,666 | + 165 |
| Nottingham Corporation | 3,928 | 3,161 | 3,164 | 3,198 | | 3,375 | 3,471 | 3,343 | 3,462 | | 11½ | 38,347 | + 1,273 |
| Oldham Corporation | 2,112 | 1,966 | 1,927 | 2,118 | | 2,154 | 2,146 | 2,279 | 2,271 | | 13 | 27,669 | + 1,023 |
| Portsmouth Corporation | 2,857 | 2,037 | 2,283 | 2,067 | | 2,165 | 2,521 | 2,177 | 2,285 | | 12 | 24,754 | + 857 |
| Preston Corporation | 1,104 | 740 | 775 | 796 | | 820 | 848 | 819 | ... | | — | — | — |
| Provincial | 2,611 | 1,757 | 1,980 | 1,869 | | 1,934 | 2,127 | 1,874 | 2,110 | | 37½ | 64,575 | + 2,950 |
| Reading Corporation | 810 | 628 | 671 | 638 | | 703 | 687 | 675 | 729 | | 11 | 7,692 | + 368 |
| Rochdale Corporation | 1,934 | 1,494 | 1,516 | 1,551 | | 1,590 | 1,650 | 1,587 | 1,637 | | 12 | 18,775 | + 169 |
| Rotherham Corporation | 699 | 709 | 734 | 743 | | 962 | 946 | 991 | 950 | | 12 | 11,802 | + 3,207 |
| Salford Corporation | 6,167 | 4,846 | 4,975 | 5,171 | | 5,228 | 5,123 | 5,444 | 5,269 | | 12 | 62,678 | + 972 |
| Sheffield Corporation | 7,412 | 6,709 | 6,664 | 6,925 | | 7,427 | 7,363 | 7,500 | 7,445 | | 13 | 93,634 | + 10,240 |
| Southampton Corporation | 1,529 | 1,246 | 1,075 | 1,238 | | 1,334 | 1,385 | 1,263 | 1,362 | | 11 | 14,344 | + 329 |
| Southend-on-Sea Corporation | 1,098 | 749 | 745 | 796 | | 868 | 927 | 868 | 980 | | 12 | 9,180 | + 719 |
| South Shields Corporation | 760 | 599 | 618 | 656 | | 709 | 744 | 688 | 771 | | 12 | 8,111 | + 1,041 |
| Sunderland Corporation | 1,493 | 1,266 | 1,262 | 1,043 | | 1,420 | 1,488 | 1,451 | 1,490 | | 12 | 16,462 | + 1,602 |
| Swindon Corporation | 198 | 154 | 152 | 154 | | 165 | 180 | 172 | 179 | | 11½ | 1,832 | + 158 |
| Tramways (M.E.T.) Omnibus Co. | ... | ... | ... | ... | | 4,379 | 4,857 | 4,676 | 5,250 | | 25 | 53,633 | — |
| Tyneside Tramways and Tramroads | 674 | 444 | 496 | 488 | | 521 | 550 | 505 | 563 | | 25 | 11,961 | + 607 |
| Wallasey Corporation | 1,514 | 1,053 | 1,124 | 1,146 | | 1,233 | 1,260 | 1,213 | 1,310 | | 11½ | 14,126 | + 871 |
| Walsall Corporation | 809 | 554 | 610 | 592 | | 630 | 614 | 593 | 617 | | 25 | 15,178 | + 1,182 |
| Walthamstow U.D. Council | 1,119 | 727 | 756 | 896 | | 835 | 751 | 727 | 898 | | 12 | 8,959 | - 350 |
| Warrington Corporation | 473 | 435 | 424 | 425 | | 448 | 457 | 472 | 453 | | 12 | 5,140 | + 318 |
| West Ham Corporation | 3,250 | 2,558 | 2,542 | 2,554 | | 2,854 | 2,764 | 2,727 | 2,832 | | 11½ | 31,635 | + 409 |
| Wigan Corporation | 1,687 | 1,262 | 1,297 | 1,340 | | 1,515 | 1,442 | 1,459 | 1,528 | | 11½ | 16,850 | + 1,895 |
| Wolverhampton Corporation | 951 | 990 | 979 | 1,010 | | 1,070 | 1,037 | 1,078 | 1,046 | | 13 | 13,253 | + 659 |
| Yorkshire (West Riding) | 1,830 | 1,231 | 1,209 | 1,308 | | 1,503 | 1,416 | 1,455 | 1,441 | | 25 | 35,203 | + 4,018 |
| **FOREIGN TRAMWAYS.** | | | | | | | | | | | | | |
| Anglo-Argentine | 50,939 | 50,968 | 50,745 | 48,852 | | 56,086 | 56,386 | 55,589 | 54,782 | | 25 | 1,338,129 | + 114,006 |
| Auckland (28 days) | ... | 18,179 | ... | ... | | ... | 20,007 | ... | ... | | 49 | 240,980 | + 31,993 |
| Bombay | 2,864 | ... | ... | ... | | 3,033 | ... | ... | ... | | 22 | 68,505 | + 2,775 |
| Brazilian (month) Mlrs. | 40,507 | ... | ... | ... | | 44,820 | ... | ... | ... | | 43 | 447,247 | + 9,595 |
| Brazilian Traction | 77,970 | 82,234 | 82,305 | 79,573 | | 90,904 | 92,913 | 94,419 | 94,152 | | 25 | 2,261,524 | + 330,701 |
| Brisbane (month | 22,850 | ... | ... | ... | | 26,560 | ... | ... | ... | | 21 | 125,990 | + 39,906 |
| British Columbia (month) $ | 491,826 | ... | ... | ... | | 566,128 | ... | ... | ... | | 48 | 6,269,123 | + 1017,780 |
| Buenos Aires Port and City (month) | ... | ... | ... | ... | | ... | ... | ... | ... | | — | — | — |
| Buenos Ayres Lacroze (month) | 43,545 | ... | ... | ... | | 45,377 | ... | ... | ... | | 47½ | 485,570 | + 41,245 |
| Calcutta Rs. | 57,798 | 55,866 | 56,986 | 55,884 | | 58,896 | 48,296 | 59,442 | 64,176 | | 25 | 15,77,012 | + 64,603 |
| Cape Town (month) | ... | ... | ... | ... | | ... | ... | ... | ... | | — | — | — |
| Carthagena and Herrerias (month) | 2,564 | ... | .. | ... | | 2,051 | ... | ... | ... | | 21 | 15,173 | + 6,011 |
| East India (Simplex petrol) (month) | 1,679 | ... | ... | ... | | 1,867 | ... | ... | ... | | 43 | 18,389 | + 2,646 |
| Kalgoorlie (month) | 3,270 | .. | ... | ... | | 3,059 | ... | ... | ... | | 21 | 14,372 | - 934 |
| La Plata (month) | 3,884 | ... | ... | ... | | 5,130 | ... | ... | ... | | 21 | 26,725 | + 5,532 |
| Lima (month) | 29,307 | ... | ... | ... | | 32,260 | ... | ... | ... | | 21 | 167,027 | + 9,085 |
| Madras Rs. | 26,065 | (2 weeks) | 23,840 | (2 weeks) | | 28,339 | (2 weeks) | 24,344 | (2 weeks) | | 23 | 2,92,609 | + 18,946 |
| Melbourne (month) | 60,500 | ... | ... | ... | | 62,000 | ... | ... | ... | | 21 | 324,000 | + 11,500 |
| Mexico (month) $ | 559,832 | ... | ... | ... | | 595,795 | ... | ... | ... | | 21 | 2,676,760 | - 36,306 |
| Montevideo (month) | 26,669 | ... | ... | ... | | 29,845 | ... | ... | ... | | 30 | 229,607 | + 17,576 |
| Para | 4,089 | 4,356 | 4,136 | 4,017 | | 3,966 | 4,211 | 4,084 | 3,890 | | 29 | 119,392 | + 3,740 |
| Perth (W.A.) | 1,760 | 1,853 | 1,774 | 1,797 | | 2,002 | 2,053 | 2,027 | 2,041 | | 25 | 51,863 | + 5,283 |
| Port Elizabeth (month) | ... | ... | ... | ... | | ... | ... | ... | ... | | — | — | — |
| Shanghai $ | 19,402 | 20,039 | 20,446 | ... | | 19,000 | 20,400 | 25,200 | ... | | — | — | — |
| Singapore $ | 10,197 | 10,665 | 10,278 | 10,196 | | 11,324 | 12,238 | 12,878 | 11,778 | | 25 | 290,830 | + 30,362 |
| Toronto (month) $ | 693,015 | ... | ... | ... | | 811,872 | ... | ... | ... | | 21 | 3,840,280 | + 524,541 |
| Winnipeg (month) $ | 298,743 | ... | ... | ... | | 326,827 | ... | ... | ... | | 21 | 1,651,336 | + 143,036 |
| **ELECTRIC RAILWAYS.** | | | | | | | | | | | | | |
| Central London | 4,281 | 4,516 | 4,487 | 4,476 | | 4,552 | 4,595 | 4,630 | 4,498 | | 25 | 127,961 | + 12,193 |
| City and South London | 3,007 | 3,020 | 2,814 | 2,880 | | 2,429 | 2,524 | 2,526 | 2,388 | | 25 | 71,378 | - 7,118 |
| Great Northern and City | 1,509 | 1,556 | 1,535 | 1,515 | | 1,288 | 1,306 | 1,358 | 1,316 | | 25 | 36,008 | - 4,942 |
| Liverpool Overhead | 1,892 | 1,594 | 1,602 | 1,604 | | 1,736 | 1,735 | 1,732 | 1,821 | | 25 | 40,910 | + 2,575 |
| London Electric | 13,605 | 13,845 | 13,665 | 13,315 | | 12,730 | 13,525 | 13,510 | 13,050 | | 25 | 355,485 | + 3,245 |
| Mersey | 2,183 | 2,117 | 2,115 | 2,091 | | 2,094 | 2,188 | 2,198 | 2,210 | | 25 | 56,019 | + 3,473 |
| Metropolitan | 18,646 | 18,104 | 18,725 | 17,975 | | 17,579 | 17,781 | 18,273 | 18,020 | | 25 | 416,601 | + 3,068 |
| Metropolitan District | 13,681 | 12,728 | 13,032 | 12,938 | | 12,702 | 13,346 | 13,209 | 13,161 | | 25 | 328,713 | + 13,127 |

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# E.C.C.

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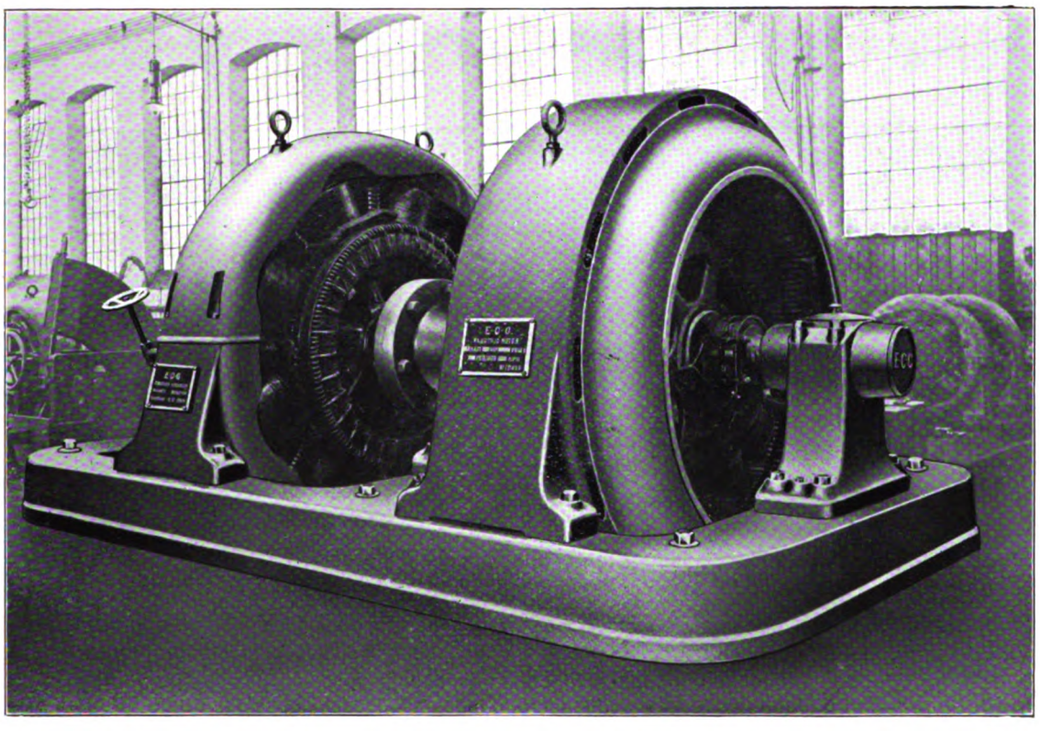

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# BERNA

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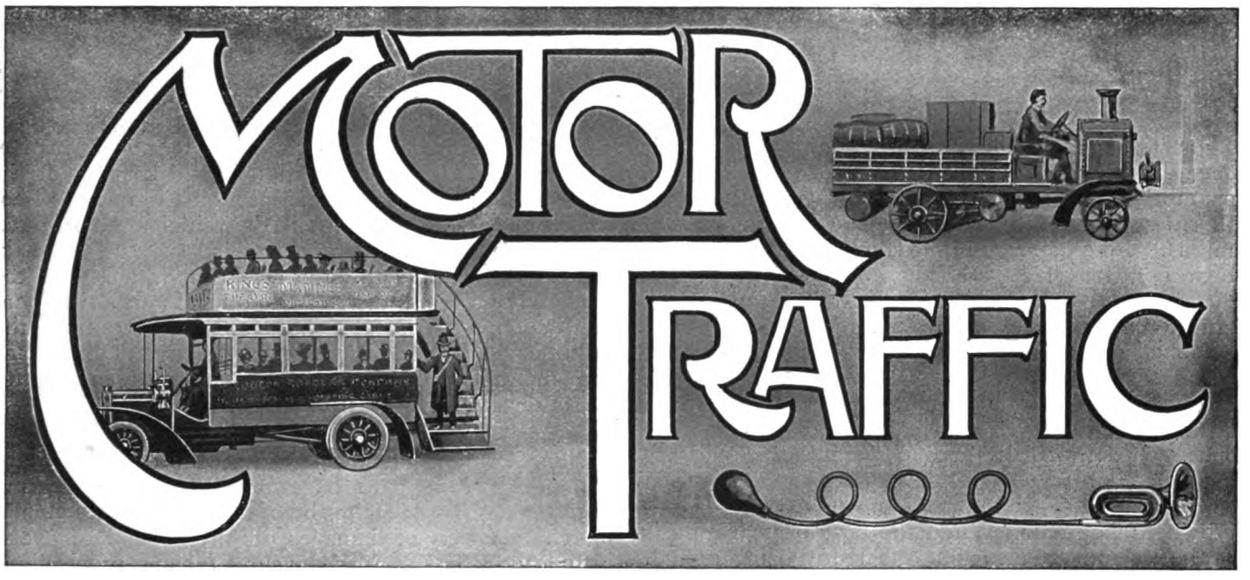


One can now spend a day in the streets of London without observing a motor omnibus stationary at the road side waiting for attention from mechanicians. In the old days these would have had to be telephoned for from a distant garage. Nowadays there are garages north, south, east, and west, where motor lorries and a full stock of appliances and parts are kept for remedying defects. The organisation of the London General Omnibus Company in this respect is as typical of progress as is the freedom from breakdowns, and locomotive engineers may find satisfaction in the knowledge that the dual advance has been made under the direction of one of their number who was formerly connected with the London, Brighton, and South Coast Railway, and who for three years has been the omnibus company's chief engineer. On November 14 last we gave a *résumé* of a paper on public service motor vehicles read before the Institution of Automobile Engineers by Mr. T. B. Browne, the president, in which interesting details were given of the steps taken to secure the degree of perfection to which London's motor service has attained. Mr. Browne enlarged upon the subject in a paper which he submitted last month at the summer meeting of the kindred body at New York. Therein we find a reference to the reliability of the vehicles, and a chart showing the percentage of involuntary stops during 1910, 1911, and 1912. The total distance covered by the London vehicles per month now averages over 8,000,000 miles, and the total miles lost from all causes by the "B" type vehicles for March last was 0·136 per cent. of the total possible mileage. The involuntary stops from all causes per 100 miles was 0·012, or 12 stops for every 100,000 miles. Of the remarkable despatch with which the company deals with breakdowns, we were recently a witness in the case of a mishap to a worm-driven back axle at the east end of Tooting Common. In half an hour the breakdown party of five men had arrived from Fulham, and in about another half-hour they had detached the live axle and rear wheels from the chassis and fitted a new axle and pair of wheels. This facility for changing the axle is a feature of the "B" type chassis, and Mr. Browne informed his American audience that the change has been made on the road in 45 minutes. Some points of interest concerning other makes of omnibus were mentioned in the paper. The London General, before starting to manufacture their own chassis, had tried some 32 different kinds of omnibus, and although they do not quite accord with the police requirements for the reduction of weight to $3\frac{1}{2}$ tons, a considerable number of the older vehicles are still running, including 118 De Dions, 60 Straker-Squires, and a number of Leylands. The output capacity of the London General and the Daimler Company is 30 vehicles a week each. Concerning the average running costs of the "B" type, Mr. Browne is of opinion that it is about on a par with that given for the Tilling-Stevens petrol-electric, namely, just over 7d. per mile.

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One beneficial effect of most of the motor omnibus manufacturers now being indirectly, if not directly, interested in the operating companies is that the days of secrecy as to the cost of operation have passed. The companies making and operating the petrol-electric machine were prompt to recognise the importance of being able to give the fullest information as to running and maintenance costs. The low figures which they are able to show in respect of vehicles running over the country roads of outer London as well as on the smoother surfaces of the central districts have served, conjointly with the advantages claimed for their vehicle, to influence a considerable number of provincial authorities to adopt road motor traction. The recent entry of the chief of the London omnibus companies into the ranks of the sellers is likely to add further to the store of available information, not only as regards their own type of omnibus, but three others that are being run under their auspices. During the present year a number of municipal authorities will complete 12 months' experience of the modern conveyances. The most enthusiastic advocate of motor traction cannot expect the operating costs to be as low as the past costs in the metropolis. The difference between the road surfaces is a bar to such an achievement, and during the current year there has been an advance in the price of petrol. Nevertheless the outlook is hopeful, as witness a reference made to the omnibus department of the Liverpool Corporation Tramways in the report for the year ended March 31 last. Of the two petrol-electric machines put into service at the end of November last it is recorded that they have worked most satisfactorily, that they are operated at a much lower cost, and that they are greatly appreciated by the public owing to their smooth running and comparatively little noise. Omnibuses propelled solely by petrol engines are also showing improved results in the provinces, for the annual report of the Eastbourne Corporation motor omnibus undertaking shows that two Leylands, which are

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# MOTOR TRAFFIC.

the most recent additions, are maintaining their silence in running and their economy in fuel consumption. Eastbourne is one of the two authorities who have relied solely on the motor omnibus. Like pioneers in most other movements the two Corporations have had to face financial discouragement, but the same can be said for a good many tramway undertakings. However, the convenience to the public has been great, and the Council at the end of 10 years have repaid more than half of the loans and can point to several years in which a net profit has been shown. For the year ended March 31 last, the net profit reached the record sum of £711, the gross profit being £3,724 on an expenditure of £10,337 incurred in the running of 22 vehicles, many of which were second-hand when acquired. While the cost per car-mile is high the receipts are also high, the figures being 14·39d. and 15·16d. respectively. The first-mentioned figures include interest and repayment of loans and instalments on 'buses purchased out of revenue. Notwithstanding the increased cost of fuel the cost per car-mile was exactly the same as in 1911-12, but the receipts improved by more than a penny per car-mile.

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Reference was made in an article in our issue of June 5 to the need which has arisen for a thorough consideration of the question of liability for road maintenance by everyone concerned in road and rail transportation of passengers and goods. Attention was also drawn to the circumstance that although in the past Committees of the House of Commons had refused to impose against the will of the promoters of railless traction bills any fixed contribution for road maintenance, as they were of opinion that there should be general legislation on the subject, this session the Committees are placing upon companies a contribution of one-third of the extra road maintenance cost incurred in consequence of trolley vehicle traffic, such proportion not to exceed three-eights of a penny per mile run. Municipal traction undertakings providing railless trolley and motor omnibus facilities outside of their own areas are being made liable for one-third of the cost of road widening or of providing footpaths as well as for the extra expense of road maintenance and repair. Failing agreement as to the extra expense, arbitration is to be resorted to at the end of the first year, and subsequently at the expiration of every three years, or any less period as may be agreed upon. For this purpose records are to be kept showing the rates, journeys, and mileage run. If, in view of future legislation, the traction undertakings think fit to apply for the recission or modification of these provisions, they are given liberty to make such application. The House of Commons Committees would have been better advised if they had waited for general legislation and refrained from imposing these liabilities. Several reasons may be advanced for this contention, one being that such burdens are calculated to hamper the provision of railless trolley and motor omnibus facilities. Another objection is that the restrictions referred to cannot be imposed upon companies who run motor omnibuses, as in their case Parliamentary powers are unnecessary. Outside of London it is only necessary to obtain licences for the vehicles from local authorities, and if these are not forthcoming the omnibus company can set down passengers in any street, and provide places on private ground for taking them up. In London licences are obtainable for any number of omnibuses so long as the requirements of the police are met as to the weight and absence of noise. A still greater objection to the keeping of the records imposed by the House of Commons Committees would be apparent if the vehicles were to run through a number of districts, as is the case in London, Birmingham, and their environs. In the Midland city and districts the local authorities are glad enough to accept the facilities offered by the omnibus company without imposing any conditions for road maintenance, for they recognise that traffic facilities are an every day necessity and convenience.

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The foregoing is the view that the Parliamentary Committees ought to have taken, leaving objecting authorities to make claims before the appointed tribunal for the recovery of damages on the ground of extraordinary traffic. In the event of such proceedings being taken it is certain, from decisions already given in regard to other classes of heavy traffic, that passenger transport would be adjudged to be ordinary traffic. It is to the Road Board that local authorities should look for more liberal aid than they at present receive towards rendering their roads fit to carry motor traffic. This course may be recommended to such bodies as the Epping Rural Council and the Southwark Borough Council. The former are petitioning all the highway authorities in Essex to oppose the London omnibus services to places bordering on Epping Forest, on the ground that the traffic is dangerous to the public owing to the narrowness of the roads, and a great expense to the ratepayers. More sensible views are taken by the Epping Urban Council, who consider that the omnibuses bring a greater amount of trade to the town than they take out, that they do no more harm to the roads than motor cars, and that they are not so dangerous to the public. Southwark Borough Council have passed a resolution requesting the London County Council to insert in their next General Powers Bill a clause enabling any rating authority in the metropolis to charge and recover from the owner or owners of motor omnibuses plying for hire either wholly or partially in the area controlled by such authority a sum equal to such amount in the pound on the annual value of the undertaking in such area (the annual value to be ascertained by a calculation of receipts and expenses of the undertaking in the area) as shall equal the amount of the general rate in the pound imposed from time to time in the locality. The reports of the Southwark Council meeting do not reveal the loose reasoning by which the authority consider it possible for the omnibus companies to give a return of their receipts and expenses in the 29 borough council areas, and it is just this difficulty that would wreck the procedure adopted by the House of Commons Committee if they were so short sighted as to attempt to apply it to any railless trolley or motor omnibus scheme which embraced more than one or two districts. It is to be hoped that this and other aspects will not be lost sight of by the representatives of traction interests when the bills of the present session come up for final reading.

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Electric Motor Car Run from Scotland to London.—An electrically driven Arrol-Johnston car fitted with an Edison storage battery, on June 9, 10, and 11 ran successfully from Dumfries to London, via Manchester. Thirteen charges were given to the battery during the run of 380 miles. The battery, which weighs 900 lb., is fitted in two portions, one under the bonnet and the other under the seats.

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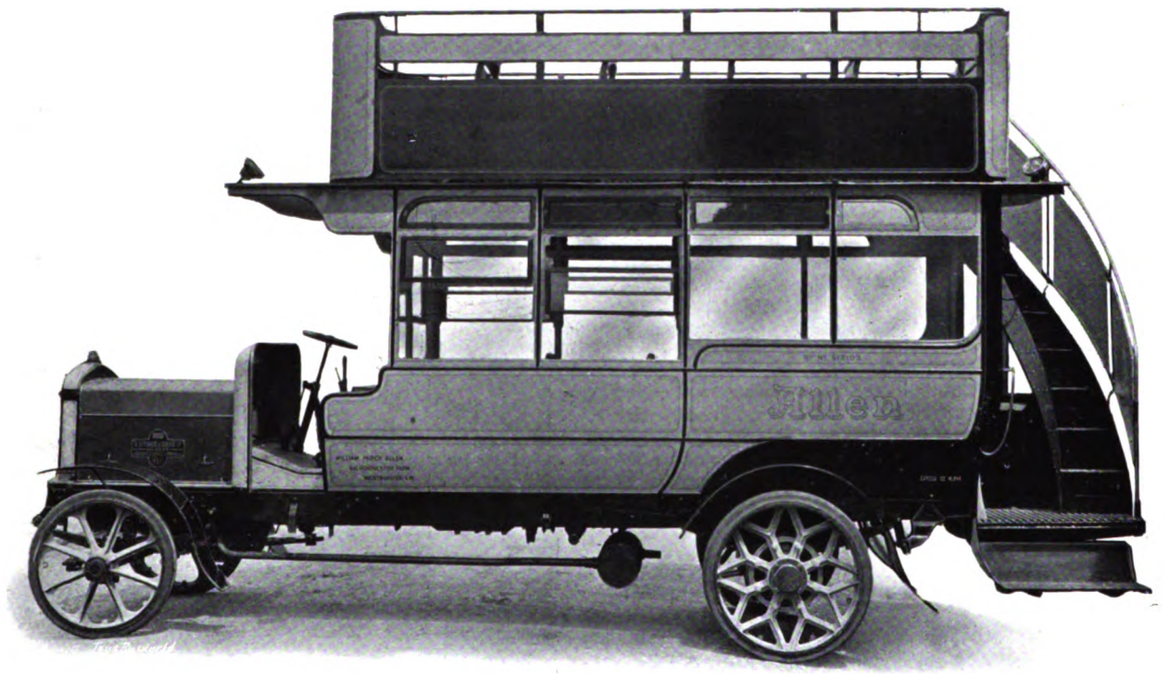
# MOTOR TRAFFIC.

## NEW STRAKER-SQUIRE LONDON OMNIBUSES.

A new type of omnibus is now being put into service in London by Mr. William Percy Allen, and will be known as the "Allen." The present arrangements include the running of 20 of these vehicles on the Victoria to Liverpool Street route. As will be seen by the illustration, the design is a notable advance upon anything now running, and as special attention has been paid to the comfort of the passengers, it is expected that the service will immediately become popular.

The chassis is the Straker-Squire new "C.O." type, with live axle, and the following is a brief specification: Overall length, 19 ft. 6½ in.; overall width, 7 ft. 1¾ in.; wheel base, 13 ft. 6 in.; wheel gauge, 5 ft. 9¼ in.; length from dash to rear of frame, 15 ft. 3⅞ in. The frame is constructed of pressed steel braced together with transverse members of pressed steel, the gusset plates being made solid with the cross members. The engine has four cylinders, cast in pairs 4¼ in. by 5 in., the inlet and exhaust valves being all located on the same side and operated by one cam shaft. The valves are all interchangeable. The crank shaft is of high-tensile steel, running in three white metal-lined bearings; the crank case is so arranged that the bottom portion can be dropped between the clutch and the gear box is provided with double universal joints. The gear box is of the silent chain-driven type, giving three speeds forward and one reverse, the third speed being the direct drive. The gears are operated by a single lever working in a gate, the shafts being mounted in ball bearings enclosed in cages. External double-grip and internal expanding brakes are fitted, the former being operated by a foot pedal and acting upon a drum mounted on the gear box shaft, while the hand brake acts upon the inside drums of the road wheels. This is of the compensation type, the wearing parts of which can easily be adjusted and renewed. The front axle is of the Ackerman type, the steering being effected by screw and nut gear of a design which has been specially constructed to meet the requirements of the London police authorities. The road wheels are of cast steel, the front being fitted with single tyres 900 by 100 mm., and the back with twin tyres 1,000 by 100 mm. The transmission from change speed gear box to back axle is by cardan shaft and worm-wheel gearing, the worm being of special case hardened steel, and the worm wheel of hard phosphor bronze. The live axle is a steel forging of special design, and is of great strength. The road wheels rotate upon the stationary axle forging at the end of the tubular arms, the drive being transmitted through two shafts direct to the wheels. The shafts carry no portion of the weight of the vehicle. The differential is of the bevel type, and




New Straker-Squire Omnibus for London Service.

without interfering with the crank shaft bearings. Inspection doors are also provided. The lubrication of the engine is on the automatic principle. A sump is cast in the lower portion of the base chamber, into which the oil is placed. An oil pump driven by spiral gearing from the cam shaft circulates the oil through troughs cast in the bottom half of the gear case. These are always kept at a constant level, and scoops fitted into the connecting rods provide a very efficient lubrication for the big ends, the splash giving the necessary lubrication for the gudgeon pins, pistons, etc. A test cock is provided in the crank case for the purpose of ascertaining the oil level from time to time. A Bosch high-tension magneto is fitted at the side of the engine opposite to the valve gear. This is secured in position by a bridle, and is both accessible and easily removable. The drive of the magneto and cam shaft is by helical wheels, a small lever fitted to the steering regulating the spark. The cooling is on the thermo-syphon principle, the radiator being of the gilled tube type. Vanes on the periphery of the fly wheel form a fan for the purpose of drawing air through the radiator.

The control of the engine speed is carried out by means of a foot pedal acting upon the engine throttle. A small lever is fitted to the dash board for setting the engine's revolution at a low speed, all acceleration being done by the foot pedal. The clutch is of the leather-faced type with self-contained thrust spring. The connection the driving wheels revolve on floating bronze bushes. All the back axle bearings are of the ball type with ample ball thrust. Specially constructed rear springs are fitted in order to take the driving strains and torque. These are hung in shackles at the rear end and fixed at the front end. A removable sheet-steel undershield is bolted underneath the frame, the clutch and change-speed gear being also enclosed in a dust-proof casing.

The body is an entirely new registered design, and was built by Christopher Dodson, Limited, of London. It is constructed to carry the usual number of passengers, the inside seating accommodation, however, being arranged partly on cross seats facing forward and partly on longitudinal seats. Special attention has been paid to the ventilation of the interior, sliding half-glasses being fitted to the fore-end of the body. Owing to the use of Dodson's patent crossbars the bodies of these vehicles are much lighter than the standard type now running in London. By this means it has been possible to considerably reduce the weight of the bottom framing and at the same time retain the stability and strength required for public service vehicles. As the Allen omnibus is upholstered in apple green velvet with superior fittings, electric light, etc., a very handsome effect has been obtained. The exterior is painted in primrose yellow, relieved with black, and it is safe to say that in appearance the new vehicles will be the most distinctive on the London streets.



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# MOTOR TRAFFIC.

## COMMERCIAL MOTOR VEHICLE EXHIBITION.

THE COMING SHOW IN LONDON.

The exhibition of commercial motor vehicles, promoted by the Society of Motor Manufacturers and Traders, which is to be held at Olympia, London, from July 18 to 26, promises to be of great and varied interest. It is now no less than five years since a similar show was held in London, and during that interval great progress has been made. In all, there will be about 175 exhibitors.

In order to call public attention in good time to the show, the Society of Motor Manufacturers and Traders gave a dinner at the Grand Hotel, Charing Cross, London, on July 3. Mr. S. F. Edge, president of the Society, was in the chair, and among others present were: Lieut.-Colonel A. F. Mulliner, E. M. C. Inston (Daimler Company), vice-president, F. W. Shorland (Clement Talbot), S. Straker (Sidney Straker and Squire, Limited), chairman of Commercial Vehicle Committee, Raymond Dennis (Dennis Brothers, Limited), R. Barry Cole (Commercial Cars, Limited), F. Churchill (J. and E. Hall, Limited), W. Dewiss (Milnes-Daimler), J. Maughfling (Thornycroft and Company, Limited), A. Spurrier (Leyland Motors, Limited), Chas. Jarrott (Jarrott and Letts, Limited), A. S. Mays-Smith (Delaunay Belleville, Limited), P. Liversidge (Liversidge Brothers, Limited), H. Smith (Rover Company, Limited), J. D. Siddeley (Deasy Motor Car Company, Limited), D. Citroen (Minerva Motors, Limited), A. Brown (Brown Brothers), H. A. Blackie (Exhibition manager), C. D. Clayton (Press manager), and T. F. Woodfine (secretary of the S.M.M. and T.)

In proposing the toast of "The Exhibition," Mr. Sharpnell Smith referred to the great progress mechanical road traction had made during the past five years, and said he felt confident that the display at Olympia, coupled with the fact that the railway companies had raised their transport rates some 4 per cent., would result in a very large increase in the number of motor vehicle users in all parts of the country.

Responding to this toast, Mr. Straker said that everything possible had been done to make the forthcoming show a success, and they had every reason to hope that it would prove to be the finest exhibition of industrial motor vehicles that had ever been held. In response to the society's invitations, municipal authorities from all parts of the world had arranged to visit the exhibition.

The Chairman proposed the toast of "Our Guests," and reminded the company that the use of motor vehicles not only economically replaced horses, but meant increased trade. In London alone £35,000,000 was paid annually for haulage, and although a considerable portion of this was now earned by horses, in the comparatively near future there could be no question but that the bulk of it would pass to the motor vehicle.

SOME EXHIBITS.

With the exception of the annex the whole of the available space has been taken up at Olympia. Amongst the large number of exhibits will be found motor vehicles for every possible trade or industry. A few preliminary particulars which have already come to hand are as follow:

THE ALBION MOTOR CAR COMPANY, of Glasgow, will exhibit no less than six distinct models. First is a 15-H.P. box van with 9 ft. wheel base, to carry a load of 15 cwts. (exclusive of weight of body). The body has a sliding panel behind the driver, and high side doors fitted to the driver's seat. It is fitted with 880 mm. by 120 mm. plain Dunlop pneumatic tyres on the front wheels and solid tyres to the rear wheels. A 16-H.P. 25-cwt. special box van built to the order of Messrs. James Buchanan and Company, distillers, London, is also shown. It has a wind screen in front of the driver, and high side doors to the driver's seat, and solid tyres on all wheels. Next is a 25-H.P. 2-ton chassis. This is the Albion Company's latest model, which is being exhibited for the first time. It is designed to carry a load of two tons plus weight of body. A 32-H.P. 3-ton chassis is designed to carry a load of three tons plus weight of body. The wheel base is 13 ft. 1 in., and the machine is fitted with steel wheels. A 32-H.P 29-seated torpedo chars-a-banc, has a wheel base of 14 ft. 5 in. This luxurious chars-a-banc has six rows of seats, each seat to take five persons, except the driving seat, which holds four including the driver. The vehicle is fitted with Cape cart hood and folding wind screen. A 32-H.P. 4-ton lorry, has a plain platform 13 ft. long by 6 ft. wide. It is interesting to note that a duplicate of this vehicle obtained the gold medal at the St. Petersburg Motor Show in May.

THE BERNA COMMERCIAL MOTORS, LIMITED, will include in their exhibit a 5-ton lorry, of which we give an illustration. They inform us that the remarkable record of this type of machine has led to its free use both at home and abroad. It is very widely used, especially in the Manchester district. In keen competition with other well-known makers this firm recently secured a number of orders in that neighbourhood and so satisfactory has the service been that already they have received repeat orders for similar vehicles. As evidence of the reliability of these vehicles the Berna Company have received a report from the Dundee Motor Lorry Company in which they state that after fifteen months' continuous service, during which time it had never had

Berna 5-Ton Lorry.

any overhaul or shed day, the first of the 5-ton lorries purchased from them has been thoroughly overhauled. Every part was examined and cleaned, but the only part it was necesssry to renew was a band for the off-side rear band brake. The writer of the report states that he has had considerable experience with commercial vehicles, but had never before met a 5-ton lorry that would run during a period of fifteen months, do over eleven thousand miles, and then finish up with what his foreman calls a "childish overhaul."

COMMERCIAL CARS LIMITED, of Luton, will show some five models covering a wide range of useful work in the traction field. These

Commercial Cars Wagon—Method of Tipping.

will include chars-a-banc, vans, lorries, etc., but the exhibit which will be of special interest to the majority of readers will be the special tipping wagon, which we illustrate above. As will be seen,

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# MOTOR TRAFFIC.

this particular vehicle was built for the Bedfordshire County Council. It is constructed to carry loads, including body, of six tons, and is fitted with a 40-H.P. 4-cylinder engine, 120 mm. bore by 140 mm. stroke, designed to run at 850 revolutions. The control, however, enables speed variations from 200 to 1,250 revolutions per minute. The cylinders are cast in pairs, and the engine is entirely enclosed in oil-tight and dust-proof casing. Automatic lubrication is maintained by means of an oil pump driven by skew gear off the cam shaft. The Commer Cars patent gear box gives three speeds forward and a reverse with direct drive on top speed, the gears being always in mesh. The final drive is by means of side roller chains, which can be enclosed in the company's patent oil-tight cases if necessary. The method of

**Commercial Cars Tipping Wagon.**

operating the tipping gear, as will be seen from the illustration, is extremely simple. In front of the change-speed gear box, bolted direct to it through an adapting flange, is an aluminium gear case, oil-tight and dust-proof; in this is a worm and worm wheel. The worm is keyed to a special shaft forming an extension of the front portion of the main shaft of the change-speed gear box proper. The worm is provided with suitable ball thrust, and the whole of this part of the gear runs in oil. A connection is made with the lifting screw, which is operated as shown in the illustration. The worm wheel is thrown in and out of gear by a lever which fits on the end of a spindle supported by a bracket direct to the side members of the frame. The Bedfordshire County Council have now three of these machines at work, each of which is giving complete satisfaction.

DENNIS BROTHERS.—One of the exhibits on the stand of Dennis Brothers. Ltd., of Guildford, will be a 66-H.P. four-cylinder fire engine similar to that recently supplied to the Leeds City Corporation, an illustration of which is here given. The Gynn pump has a capacity of 400 gallons per minute, and the machine carries a 55 ft.

**Dennis Fire Engine.**

escape. A feature of special interest in this model is the fact that instead of the customary chemical first-aid equipment, an auxiliary gear-driven pump is fitted, which works at about 100 lb. pressure through the first-aid hose. We understand that Messrs. Dennis will include two entirely new models in their exhibit.

THE CONTINENTAL TYRE AND RUBBER COMPANY (GREAT BRITAIN) have succeeded in obtaining an excellent position in stand No. 174. The feature of their exhibit is of course the famous "Continental" "T" pattern solid tyre. This is the original "T" section tyre, as opposed to the round pattern. The chief advantage lies in the fact that the wearing surface remains practically the same width from the beginning to the end of the tyre's life. The extraordinary resiliency gives an extra mileage, and it is principally on this extra mileage that the Continental Company base their claims for their "T" pattern tyres. Sections as well as complete tyres will be shown as evidence of the good wearing qualities of these tyres. We are informed that a record was kept of nearly 700 tyres used consecutively on Messrs. Tillings' motor omnibuses, and the average was over 20,000 miles per tyre.

THE MIDLAND RUBBER COMPANY will show specimens of all classes of Midland solid and pneumatic tyres for commercial motor vehicles in varying sizes and patterns, solid band tyres of three distinct sectional designs being standardised; viz., square tread, round tread, and concave or "T" pattern. Among the company's exhibits are solid band tyres suitable for heavy steam traction work up to 170 mm. in section; grip or clincher pattern solid tyres suitable for light commercial motor work; grooved, ribbed, and steel-studded "Midland" and "Britannic" pneumatic tyres made specially for commercial work; specimens of wheels, steel felloes, and flanges suitable for various classes of work; photographs of numerous vehicles fitted with "Midland" tyres, and specimens of "Midland" solid tyres removed from service after running over 36,000 miles.

THE MOTOR RADIATOR MANUFACTURING COMPANY'S exhibit will include radiators of Zimmermann honeycomb type for "Fowler" tractor, radiator of Zimmermann honeycomb type for "Ransomes" petrol lawn mower, radiator of gilled tube type for Wolseley "Subsidy" lorry, radiator in Zimmermann honeycomb type for "Hillman" van, and radiator in plain flattened tube type for Tilling motor 'bus.

MESSRS. JOHN I. THORNYCROFT AND COMPANY are showing a number of their models. These will include a 4-cylinder 30-H.P. type "K" chassis; 3-ton lorry, War Office subsidy type; a brewer's dray mounted on the same chassis; a 4-cylinder 30-H.P. type "J" chassis fitted with a 28-seated chars-a-banc; a 4-cylinder 30-H.P. type "M" chassis fitted with a colonial 2½ ton lorry; a 4-cylinder 30-H.P. narrow type "D" with a 2-ton sheet body; and a new 4-cylinder 16-H.P. 35-cwt. box van. They will also have machines on the stands of Messrs. E. and H. Hora and Bayleys, Limited.

## MOTOR TRANSPORT CONFERENCE.

ARRANGEMENTS FOR AN IMPERIAL EVENT.

A large number of overseas delegates will attend the Imperial Motor Transport Conference which is to be held in London from July 18 to 25. The conference opens on the first-mentioned date, when the delegates will be entertained at luncheon at Olympia, Kensington, by the President and Council of the Society of Motor Manufacturers and Traders, on the occasion of the opening of the Exhibition of Industrial Motor Vehicles organised by that Society.

The meetings and the subjects to be discussed will be as follow:

Monday, July 21.—The fuel question and the possibilities of creating an adequate fuel supply for internal combustion engines within the Empire. Particular stress will be laid on questions relating to the production and use of alcohol as a fuel. Papers will be submitted by Sir Boverton Redwood, Bart., advisor on petroleum to the Admiralty, the Home Office, and the India Office; Professor Vivian Lewes, of the Royal Naval College, Greenwich; Mr. A. J. Butterfield, Assoc.Inst. C.E., and Dr. W. R. Ormandy.

Wednesday, July 23.—Motor vehicles for military use, and the production of vehicles suitable for military purposes, and also for ordinary industrial use throughout the Empire. Official statements will be made on behalf of the Army Council by Col. H. C. L. Holden, and Captain A. E. Davidson, secretary of the Mechanical Transport Technical Committee. Further papers will be submitted by Col. R. E. Crompton, Captain R. K. Bagnall-Wild, formerly secretary of the Mechanical Transport Committee, and Mr. Horace Wyatt, editor of *Motor Traction*, organising hon. secretary for the conference.

Friday, July 25.—The carriage of goods and passengers by motor vehicle. Papers will be submitted by Mr. W. Worby Beaumont, consulting engineer to the Chief Commissioner of Police; Mr. E. A. Greathed, general manager of the National Motor Cab Company; Col. R. E. Crompton, consulting engineer to the Road Board; Mr. G. Hamilton Grapes, representing the Postmaster-General of New Zealand; Mr. W. Tetley Stephenson, lecturer on transport at the London School of Economics; Mr. P. Ellison, general manager of the Eastbourne Corporation Motor Omnibus Department; and Mr. F. R. de Bertodano, managing director of the F.I.A.T. Motor Cab Company.

The president of the conference is Prince Arthur of Connaught, and the chairman of the Executive Committee is the Hon. Arthur Stanley, M.P., chairman of the Royal Automobile Club.

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# MOTOR TRAFFIC.

## MOTOR VEHICLES AT THE ROYAL SHOW.

Although some excellent examples of the various types of road motor vehicles suitable for all descriptions of haulage were to be found as usual in the machinery section of the Royal Agricultural Show at Bristol, it was obvious that the forthcoming exhibition at Olympia overshadowed the "Royal" to a considerable extent. Individual exhibits were well up to the usual standard maintained at these shows by the leading manufacturers of industrial motor vehicles, but in point of number there was a falling off, and one missed several of the firms hitherto to be found at the Royal Agricultural Society's annual exhibition. A notable feature was the largely increased use of motor vehicles for the conveyance of material for the show buildings, the exhibits themselves, and the stores and provisions required for the accommodation of the vast number of visitors to the show ground. In this connection the machines of the Bristol Tramways and Carriage Company rendered excellent service, while a number of railway motor lorries and various makes of motor vans formed a constant link between the railway depots and the show ground right up to the opening of the exhibition.

The Bristol Tramways and Carriage Company, Limited, maintained an excellent service of motor omnibuses and chars-a-bancs to and from the joint railway station and the Show, in addition to a large fleet of their well-known blue taxi-cabs. Together with an efficient tramway service up to Durdham Downs, where the Show was held, these formed a most complete system of communication which was much appreciated by the outside visitors. The company were also exhibitors, and on a well-arranged stand displayed two machines, both of the new 3-ton worm-driven type with 28-H.P. four-cylinder engines. The cylinders are cast in pairs and the valves are all on one side, the springs and tappets being enclosed. The gear box gives four speeds forward and a reverse, and is operated by central control levers. The company's own pattern carburettor is fitted, an interesting feature of which is the fact that it will take a fuel mixture having 50 per cent. of paraffin. The bodies fitted to the exhibition models were of the lorry type, one being suitable for use as a brewer's dray and the other a flat platform with rail for a cover.

Leyland Motors, Limited, had an exceptionally fine exhibit, consisting of four models of their well-known standard practice. Of these a 400-gallon fire engine, fitted with a Rees-Roturbo pump and built to the order of the Chorley Fire Brigade, attracted considerable attention. This machine, it is understood, in no way differed from the Leyland standard, which has already been described in these pages. The standard 6-ton steam wagon shown is part of an order for 13 of these vehicles now in hand. They are fitted with a steam superheater and exhaust water heater, and as a result of this arrangement the consumption of fuel and water is no more than that of the ordinary 5-ton wagon, each on full load and under similar conditions. The steam pressure on these machines is 230 lb. per square inch, and the superheater takes the form of a single coiled steel tube placed just under the fire box tube plate. The fuel used is the ordinary gas works coke, and under ordinary conditions the consumption is 1 cwt. per 6 to 7½ miles. A 4-ton 40-H.P. covered van was another exhibit. This was a repeat order from Robertson and Sons, of Manchester, while the fourth vehicle was a 30-cwt. petrol chassis constructed to War Office regulations to qualify for the subsidy. In this model the double reduction gear for rear axle drive is enclosed in a casing bolted to the rear axle. The cardan shaft is enclosed in a tube, the forward end of which is provided with a large spherical bearing carried by the cross member. The 24-H.P. engine has four cylinders 4 in. by 5 in., with Bosch magneto ignition. Including 65 already delivered, Messrs. Leyland have received orders for 120 of this type of machine since it was placed on the market a few months ago.

Sidney Straker and Squire, Limited, of Nelson Square, London, showed two machines, namely, the C.O. model, which is described on another page, and a new 30-cwt. (C.W.) model, the latter being one of the novelties of the show. This machine is fitted with a 21-H.P. engine having four cylinders, 90 mm. bore. and 120 mm. stroke, with interchangeable valves all on one side. The whole of the cylinders are in one casting, with large water jackets: Bosch high-tension magneto ignition driven by gearing from the cam shaft is fitted. The cooling is on the thermo-syphon system, while a geared oil pump maintains efficient lubrication to all parts of the engine. The gear box is arranged to give three speeds forward and a reverse, operated by a lever on the gate change principle. From the gear box the transmission is by cardan shaft to the worm drive on the rear axle. The entire worm drive and differential are mounted on a steel casting placed on the top side of the axle, which is made up of a forging of high-tensile steel. It is anticipated that this model will be in considerable demand for light omnibus and van work where a good speed with a moderate load is desired.

Aveling and Porter, Limited, of Rochester, had a prominent stand. Included in their exhibit were a 5-ton steam tractor, a rubber-tyred 3-ton steam wagon, and the latest production of the works—a 4-ton petrol lorry.

Barford and Perkins, Limited, of Peterborough, exhibited their motor rollers in various sizes, including a new model weighing 10 tons empty or 11 tons with water ballast.

Fodens, Limited, of Sandbach, staged two models of their well-known steam vehicles, viz., a 5-ton steam wagon with steel tyres, and a 3-ton machine with rubber tyres built to the order of Messrs. Boots, chemists, of Nottingham. The latter machine has several special features incorporated, the most important being a feed water heater, special lubrication arrangements, and the attachment of wood segments to the large gear wheels with a view to reduce noise.

Richard Garrett and Sons, Limited, of Leiston, were responsible for a most interesting exhibit. Amongst their machines was a Garrett 5-ton patent compound superheated steam tractor, built to the order of Messrs. Rose and Sons, haulage contractors, of King's Lynn. As already explained in a previous issue of this journal, the special features of the Garrett machine is the inclusion of the company's patent superheater and balanced piston gear, which are responsible for the remarkably low fuel and water consumption, coupled with a large increase of power.

J. and E. Hall, of Dartford, exhibited three distinct models. These were a 24-seat chars-a-banc and two goods carrying machines. The most interesting of the latter being a 32-H.P. tipping wagon built to the order of the Sheffield Corporation.

Dennis Brothers, Limited, of Guildford, were represented on the stand of William Vincent, of Reading. Two models were shown, and the one in the form of a motor horse box proved to be a very great attraction. This vehicle is the outcome of a long and careful study of the requirements of horse transit, and the important points in construction are covered by patents. From the interest displayed by the visitors it was evident that the enterprise shown by Mr. Vincent was appreciated.

## BRITISH AUTOMOBILE TRACTION.

SECOND NEW DEPARTURE BY BRITISH ELECTRIC TRACTION COMPANY.

It was announced by Mr. E. Garcke, chairman of the British Electric Traction Company, who presided at the annual meeting on June 16, that the directors had formed the British Automobile Traction Company for the purpose of organising motor omnibus services wherever suitable openings presented themselves. This step is in addition to the running of motor omnibuses in London, which was inaugurated towards the end of last year in connection with the company's Metropolitan Electric Tramway undertaking, in order to meet the competition of the motor omnibuses on their tramway routes. Since then they had made agreements with the London General Omnibus Company and also with the Underground Electric Railways, and a new company had been formed, called the London and Suburban Traction Company, which had acquired the control of the share capital of the Metropolitan Electric Tramways, the London United Tramways, the Tramways (M.E.T.) Omnibus Company, and the South Metropolitan Electric Tramways and Lighting Company. The capital of the London and Suburban Traction Company was about £3,500,000, of which they held about £850,000. They had every reason to expect that the return on their investment in the London and Suburban Traction Company would be larger than it was on the separate undertakings before the amalgamation. He still considered that, given sensible legislation, electric traction on rails was capable of holding its own; and the feature which he hoped shareholders would recognise and appreciate in the directors' new policy with regard to motor omnibuses was that the management of the company was moving with the times, and was alert to take advantage of any opportunity which might present itself to compensate for past misfortunes and to improve their prospects.

Replying to the discussion, Mr. Garcke, referring to a shareholder's remark as to the satisfactory results attending small motor omnibus services over short routes on the Continent, said the point was one which was very prominently before the directors. As regarded motor omnibus services generally, however, they would adopt a cautious rather than a plunging policy.

THE REQUIREMENTS OF BLAYDON.—An appeal is to be made by Blaydon Urban Council to the Newcastle Corporation to establish a railless trolley car or motor omnibus service.

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# MOTOR TRAFFIC.

## THE INTERNATIONAL ROAD CONGRESS.

The third International Road Congress was held in London from June 23 to 27, and proved very successful. It is claimed that the great work of road reform was really begun at the first Congress which was held in Paris in 1908, and was continued at the Brussels Congress in 1910. At the meeting in London something approaching 3,000 experts, gathered from 42 countries and colonies of the world, and many of them official delegates of governments, spent two days in discussing a wide variety of subjects relating to road construction and maintenance. These discussions were carried on simultaneously in four sections. Parts of two other days were taken up with an opening and a closing general meeting, at which the final resolutions were passed, and a number of additional days were occupied by visits and inspections. These, unlike many excursions connected with congresses on other matters, were of great practical utility, because the delegates had the opportunity to examine methods of road construction and maintenance wherever they went. This is the first time that the Congress has been held in Great Britain, and it was fitting that this country, which has taken a leading part both in road construction and in the use of motor vehicles, should receive an early visit. It was the coming of the motor vehicle which brought the Congress first into existence, and the problems associated with roads are likely to call for more and more engineering and practical skill and knowledge as automobilism, particularly of the heavy vehicle order, develops. The Congress, which is organised by the Permanent International Association of Road Congresses and by an organising committee of the country in which each meeting is held, promises to be an appropriate complement to such institutions as the International Railway Congress and the International Tramways and Light Railways Congress, the latter organised biennially by the Permanent International Tramways and Light Railways Union. The next Road Congress is to be held in Munich in 1916.

The Congress was held in London on the invitation of the British Government, the King gave his patronage, and the honorary presidents were the Chancellor of the Exchequer, the Secretary for War, the Secretary for the Colonies, the President of the Local Government Board, and the First Commissioner of H.M. Office of Works. The honorary vice-presidents included a large number of noblemen and gentlemen associated with automobilism, local authorities, engineering bodies, and traders. While the Permanent International Association of Road Congresses, whose head-quarters are in Paris, whose president is Mons. Albert de Préaudeau, inspector-general of bridges and roads, Paris, and whose secretary is Mons. Albert Mahieu, engineer-in-chief of bridges and roads, Paris, was the parent body for the Congress, the arrangements were carried out by a British Organising Council. Of this body Sir George Gibb, chairman of the Road Board, was chairman, while Mr. W. Rees Jeffreys, secretary of the Road Board, was honorary general secretary. The Council was formed of representatives nominated by associations of borough and rural local authorities, automobilists, commercial motor users, quarry owners, surveyors, engineers, municipal tramways, and other bodies. The detail work was carried out by several committees.

The opening general meeting was held on Monday, June 23, in the Wesleyan Central Hall, Westminster; the meetings of sections took place on the Tuesday and Wednesday in Caxton Hall, the Surveyors' Institution, and the Institution of Mechanical Engineers. The Thursday was devoted to excursions, including a visit to Windsor Castle on the invitation of the King, and the closing general meeting was held on the Friday in Caxton Hall. Receptions were given on various evenings by the Lord Mayor and Corporation of the City of London, by the Institution of Civil Engineers, and by the Royal Automobile Club. During the week an interesting exhibition (opened by Earl Beauchamp, First Commissioner of Works) was held at the Royal Horticultural Hall. This included all sorts of materials and appliances for road construction and maintenance, and of course methods of tar and bitumen treatment were much in evidence. There were about 80 exhibitors.

### THE OPENING MEETING.

It is impossible in the space at our disposal to go into any detail as regards the numerous meetings, but some indication may be given of the opening proceedings. The Right Hon. D. Lloyd George, Chancellor of the Exchequer, on behalf of the British Government, welcomed the delegates at the opening meeting, and dwelt on the importance of the problems with which the Congress had to deal. In doing so he drew a vivid contrast between the roads of England in the eighteenth century and the roads of to-day. The 231,000 miles of roads in this country at the present time he claimed to be about the best in the world. Next came a brief review of the enormous increase in the use of the roads since motor vehicles began, and the right hon. gentleman put the number of motor vehicles in this country at present at 220,000. From this arose the enormous importance of the science and art of road making and maintenance. In 1892 the roads of England and Wales cost for maintenance £8,500,000, while last year the cost was £15,500,000. Towards meeting the cost of improvements, the Road Board has since its formation in 1910 made grants to the extent of over £3,000,000. Sir George Gibb, who spoke next, pointed out that it was to Mr. Lloyd George that this country owed the first measure passed by Parliament for improving the roads and relieving the ratepayers of some of the costs. The financial question was a point which he emphasised, but he confessed that he did not see any considerable movement of British opinion towards the direct administration of any of the roads by a central Department of State. He thought county administration would be extended so as to cover a greater mileage, but that highway administration in Great Britain would remain a function of local government. As to methods, he said that the general trend of opinion in this country was undoubtedly in favour of the use of tarry or bituminous substances. He also commended to the foreign delegates the way in which modern road problems have been dealt with in Great Britain. A number of foreign delegates afterwards spoke.

### MEETINGS OF SECTIONS.

There were two sections of the Congress, each divided into two subsections. The leading points contained in a great number of papers prepared by road engineers and others in the various countries were, after the Continental method, summarised by general reporters (*rapporteurs*) previously appointed for the purpose, and the abstracts, together with conclusions or recommendations based on them, were the matters directly submitted to the sections for discussion. Tramways did not, except incidentally here and there, come before the meetings, but the road as affected especially by motor omnibuses and other heavy vehicles was continually under review. The meeting being of an international character, the resolutions had, of course, to be highly generalised so as to be applicable as far as possible to all the countries concerned. Perhaps one of the most remarkable things about the Congress was the smallness of the attendance and the brevity of discussions at the section which dealt with the finance of the construction and upkeep of roads and the provision of revenues. The question of who is to pay for the greatly increased and still increasing cost of road maintenance is a burning one, in this country at least, but perhaps because there is such a wide variety of practice in the matter abroad and because there is such a large proportion of national roads in foreign countries, the delegates did not appear to be greatly interested.

The abstracts of the enormous number of papers which had been contributed are in themselves very voluminous, and we must here content ourselves with an indication of the subjects of the resolutions which were prepared by the general reporters. These resolutions sought to crystallise the general opinions from a large number of countries, and they were put before the sections for discussion and adoption. The discussions were sometimes of considerable length, and numerous amendments were moved and some of them adopted. A criticism which was levelled at a good many of the amendments moved by British delegates was that they applied to conditions in this country and thus were not suitable for an international congress. This criticism was usually effective.

The following is an indication in brief of the principal resolutions passed:

*Planning of New Streets and Roads.*—It is better that new main roads be constructed to pass outside rather than through towns. Tramway tracks are best placed in the centre of roads. Main traffic roads should be designed so that spaces are provided for tramway tracks, fast and slow traffic, and standing vehicles. The planning of main road communication outside towns should be at once undertaken.

*Macadamised Roads Bound with Tarry, Bituminous, or Asphaltic Materials.*—By the use of such binders may be obtained a number of different forms of road crust which may be employed with advantage according to the conditions of traffic, locality, and climate. The exact value and duration of life of these various crusts remain to be determined. For this purpose it is desirable to draw up a uniform system of tests. Detail points were dealt with in supplementary resolutions.

*Wood Paving.*—Where gradients permit, wood-block pavement is very suitable for streets where the traffic is great but not of exceptionally heavy character. It is desirable that further investigations and laboratory experiments should be carried out in connection with the selection of timber and of the impregnating preservative. It does not appear desirable to recommend hard woods for roads with intense traffic. Soft woods are equally suitable for roads of heavy and of light traffic.

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*Methods of Lighting.*—Every vehicle should carry a light which can be seen from the rear as well as from the front. Every motor car should carry two lamps in front and one at the back; if of high speed it must have a head light which can light the road for 50 yards. Regulations should be made to compel drivers of cattle to make their presence known.

*Observations since 1908 on Causes of Wear of Roads.*—Weather conditions are among the most powerful influences which cause deterioration of roads. The destructive effect of weather can be minimised by effective waterproofing on the road surface. Any considerable volume of motor traffic has a seriously damaging effect on water-bound macadam roads. The damaging effect of heavy motor vehicles can be minimised by the use of wheels of large diameter, tyres of suitable width, rubber tyres, and suitable springs. The International Permanent Commission is charged with the preparation of a programme of observations, studies, and experiments.

*Regulations for Fast and Slow Traffic.*—These should be as few and simple as possible, and should be universally enforced. In all large cities there should be a traffic authority. Drivers should be carefully trained.

*Authorities in Charge of Roads.*—It is impossible to lay down any general rule of universal application as to the extent to which the road organisation of any country should be centralised or decentralised. The unit of administration should be sufficiently large and command sufficient resources to employ and adequately remunerate a competent staff.

*Finance of Construction and Upkeep.*—The expenditure on the maintenance of main roads should be mainly paid out of national revenues subject, where local administration prevails, to the supervision of a central government authority. It is equitable that vehicles which cause special damage to roads should be subject to special taxation, the proceeds of which should be earmarked for expenditure on roads.

### THE CLOSING MEETING.

At the final general meeting in Caxton Hall on June 27, after the resolutions had been confirmed, Sir George Gibb, who presided, gave a short farewell address to the delegates. The representatives of a number of foreign countries delivered speeches expressing appreciation of all that they had seen, and of the hospitality they had received. Votes of thanks closed the proceedings.

## I.A.E. VISIT TO AMERICA.

During several weeks in June a considerable party of members of the Institution of Automobile Engineers paid a visit to the United States, when the Society of Automobile Engineers of that country gave them a most hospitable reception in return for the welcome accorded to the Society on the occasion of their visit to Great Britain two years ago. An interesting sight at the huge building in New York of the Automobile Club of America was the garage, containing 600 cars, and the testing laboratory. The latter was installed in 1910 for the purpose of testing motors or any individual parts thereof; these tests may be either a private test solely for the benefit of the inventor or a public test on the lines of those held by the Royal A.C. The plant consists of an electric cradle dynamometer and all the necessary recording instruments, one of the most interesting of which is an instrument used for recording the amount of fuel consumed at any part of the test as well as that used for the whole duration of the test. Visits were also paid to the Carnegie Steel Works at Pittsburg and to Indianapolis, where a 500 miles race was witnessed, and several works were visited, including the Prest-O-Lite factory where are manufactured the tins of pressed acetylene gas referred to by Mr. Coffin in his paper before the Institution in 1911; these tins can be obtained all over the country, the empty tins being left in exchange. The visit to Detroit proved to be the most interesting. First the Ford factory, with an output of 200,000 cars this year, was a revelation to the visitors, the machine tools and the system being remarkable. Other works inspected included those of the Hudson Motor Car Company, the Continental Motor Manufacturing Company, and the Chalmers Motor Company, where works organisation is a thing of which the owners are justly proud. The party embarked with about 600 members of the Society of the Automobile Engineers on a big lake steamer for the summer meeting of the S.A.E. Among the papers read were one by Mr. T. B. Browne, president of the English I.A.E., on "London Motor Omnibuses," Mr. E. B. Wood on "Engine Testing;" Mr. Thos. Clarkson on "Steam Omnibuses;" and by Mr. Chas. Wheeler on "Depreciation." Cleveland, Buffalo, and New England also entertained the visitors.

## BIRMINGHAM AND MIDLAND OMNIBUS.

Presiding at the 29th ordinary general meeting of the Birmingham District Power and Traction Company, held at the Electrical Federation Offices, Kingsway, London, Mr. C. S. B. Hilton stated that the year's operations showed a surplus of £55,449, as compared with £52,841 the previous year. Referring to the company's investment in the Birmingham and Midland Motor Omnibus Company, he stated that the horse omnibuses have now almost disappeared. Messrs. Tilling-Stevens had delivered 13 30-H.P. omnibuses, 24 40-H.P. omnibuses, all double-deck, and in addition two single-deck omnibuses, and the only other vehicles to come were 10 single-deckers. By means of motor omnibuses they were operating six routes entirely inside Birmingham, one partly inside Birmingham and running out into the Black Country, one entirely in the Black Country, and in addition a separate service in Sutton Coldfield, which started at the end of the Birmingham Corporation Tramways, and ran through Sutton Coldfield towards Lichfield. The mileage run by motor omnibuses was now about 21,000 a week, and the receipts per 'bus-mile and the behaviour of the petrol-electric vehicles was satisfactory and encouraging. The Corporation of Birmingham had decided to institute a service of motor omnibuses from the terminus of their Bristol Road tramway at Selly Oak out through Northfield to Longbridge, with the intention of continuing the service to the foot of the Lickey Hills, where the Birmingham boundary now is. The Corporation did not possess any general powers

**Tilling-Stevens Omnibus for Birmingham.**

to run motor omnibuses in extension of existing tramways, and along routes on which tramways were contemplated. It was not the company's policy to clash in any way with the development of the Birmingham Corporation Tramways, but rather to co-operate with this work, and he felt sure that this policy on their part was quite recognised by the Corporation, and that they would not in any way hamper the extension of their business on these lines. They hoped, with the co-operation of the Corporation, to start shortly a service of single-deck omnibuses from Hales Owen through Quinton into New Street, Birmingham, which would place that isolated industrial town within easy reach of Birmingham. The report was adopted, together with the recommendations contained as to dividends.

The single-deck omnibus referred to by Mr. Hilton is shown in the accompanying illustration.

MOTOR OMNIBUS POWERS FOR LEICESTER.—The Leicester Corporation bill, under which powers were sought to run motor omnibuses on three routes partly within and partly without the borough, was passed by a Committee of the House of Lords in June. It was agreed that for three years the Corporation should pay to the County Council three-eighths of a penny per car-mile, and that at the end of the period the question should be submitted to an arbitrator, who should decide what extra cost, if any, had been involved in road maintenance by the running of the vehicles, and that the Corporation should contribute one-third of the extra cost.

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# MOTOR TRAFFIC.

## PETROL-ELECTRIC OMNIBUS COSTS.

RESULTS OF THE "TILLING-STEVENS" VEHICLES FOR 1912.

Messrs. Tilling, Limited, who run the Tilling-Stevens petrol-electric omnibuses in London, have issued the following statistics for the year 1912:

| | d. |
|---|---|
| Cleaning, adjustment, and maintenance | 1·163 |
| Tyres | 1·105 |
| Drivers | 1·257 |
| Petrol, lubricating oil, grease, and paraffin | 1·197 |
| Vehicle lighting | ·075 |
| Rent, rates, taxes, garage lighting, water for trade vehicles, depreciation (6 years) | ·986 |
| Conductors | ·847 |
| Body upkeep | ·235 |
| Traffic expenses | ·267 |
| Pence per mile | 7·132 |

MILES COVERED FROM JUNE 15, 1911, TO JUNE 4, 1913.

| | |
|---|---|
| 1911 | 119,017 miles. |
| 1912 | 1,387,031 " |
| 1913 | 1,685,650 " |
| Total | 3,191,698 " |

MILES COVERED BY THE FIRST SIX "TILLING-STEVENS" PETROL-ELECTRIC OMNIBUSES FROM COMMENCEMENT OF SERVICE TO MAY 28, 1913.

| | |
|---|---|
| 1st 'bus | 81,204 miles. |
| 2nd " | 75,535 " |
| 3rd " | 75,245 " |
| 4th " | 70,839 " |
| 5th " | 64,972 " |
| 6th " | 61,601 " |
| Total | 429,396 " |

## WOLVERHAMPTON MOTOR SERVICE.

The following is a summary of the accounts for the year ended March 31, 1913, of the motor chars-a-bancs service of the Wolverhampton tramways:

| | Average per Mile run. | Year ended March 31, 1913. |
|---|---|---|
| INCOME. | d. | £ s. d. |
| Traffic receipts | 9·878 | 1,710 11 7 |
| EXPENDITURE. | | |
| *Operating Costs:* | | |
| Petrol | 1·399 | 242 3 9 |
| Wages of drivers and conductors | 2·013 | 348 9 9 |
| " of oilers and cleaners | ·241 | 41 15 6 |
| Oil, grease, and sundries | ·168 | 29 2 10 |
| Tickets, waybills, etc. | ·022 | 3 16 11 |
| Uniforms | ·063 | 10 19 3 |
| Miscellaneous | ·004 | 0 14 9 |
| | 3·910 | 677 2 9 |
| *General Charges:* | | |
| Licences | ·063 | 10 17 6 |
| Insurances | ·217 | 37 13 0 |
| | ·280 | 48 10 6 |
| *Maintenance, Repairs, etc.:* | | |
| Chassis | ·662 | 114 12 4 |
| Bodies | ·219 | 37 19 2 |
| Tyres | 1·343 | 232 10 10 |
| Depreciation of chars-a-bancs | 1·441 | 249 10 4 |
| | 3·665 | 634 12 8 |
| Bank interest | ·252 | 43 11 6 |
| | 8·107 | 1,403 17 5 |
| Balance carried to appropriation account | 1·771 | 306 14 2 |
| | 9·878 | £1,710 11 7 |

For the previous year the profit was £191, and the total working costs per mile run to 9·905d. The mileage run was 41,559 miles, as compared with 16,721.

"IMPOSSIBLE TO HIRE A MOTOR OMNIBUS FOR A SEASON."—The Tramways Committee of the Douglas Town Council have reported that they find it is impossible to hire a motor omnibus for the season, and that they are therefore compelled to abandon the proposal of a motor service.

CAB CHASSIS FITTED WITH PARCEL CARRIER BODIES.—Many of the "W. & G." express carrier vans recently placed upon the London streets have chassis which were formerly in use with cab bodies. Messrs. W. & G. du Cros, of Acton Vale, are adopting this means of turning some of their vehicles to more profitable use than has been possible in the motor cab trade with two strikes in a year. The innovation, moreover, is filling a decided want in the metropolis.

## ROAD BOARD'S REPORT FOR 1912-13.

In the House of Commons on June 23, Mr. Bridgeman asked the Secretary to the Treasury if he could state what was the cause of the delay in the publication of the report for 1912-13 of the Road Board, and if it was intended to publish it in time for discussion during this session.

Mr. Masterman replied that he did not think there had been any unusual delay. The report could not be published until the financial year was ended, and it contained accounts for that year which have to be made up and audited. It was now under consideration, and it would be presented as soon as possible.

Mr Bridgeman also asked if the Secretary to the Treasury would state what were the sums actually received by the Road Board since its formation; what amount had actually been paid out in salaries, grants, and loans respectively: what sums had been definitely promised; and what balance remained in hand, at the bank, and invested.

Mr. Masterman circulated the following reply: The receipts actually paid into the Road Improvement Fund from the constitution of the Road Board up to May 31, 1913, were as follow:

| | £ |
|---|---|
| Motor spirit duties | 2,011,719 |
| Carriage licences | 1,349,125 |
| Interest on investments | 95,739 |
| Interest on loans | 438 |
| | £3,457,021 |

The amount actually paid out in salaries during the same period was £19,407. Grants to an aggregate amount of £2,461,045 and loans to an aggregate amount of £800,067 have been definitely promised, and the amounts actually paid out have been £696,849 under grants and £128,239 under loans. The balance at the Bank of England on May 31, 1913, was £14,624, and the investments at cost amounted to £2,602,527.

OMNIBUSES REQUIRED FOR CHESTERFIELD.—In connection with the passing of the Corporation's bill relating to railless trolley traction and motor omnibuses, the Tramways Committee are to report upon the type and number of omnibuses to be obtained for testing trolley routes.

PETROL TRAMCAR FOR STIRLING.—The Stirling and Bridge of Allan Tramway Company having applied to the Board of Trade for a licence to use a petrol-propelled tramcar on their lines, the application has been granted, subject to the consents of the local authorities being given.

MOTOR VEHICLES REQUIRED IN AUSTRALIA.—During a tour made by the Minister for Lands (Mr. Bath) and the Minister for Works (Mr. Johnson) in the Yorkrakine country, Victoria, in May, the first named stated that the present railways under construction, under survey, and awaiting survey were as much as the Government could undertake for the next three years, but as a temporary expedient in some areas they were now trying to see if they could not introduce road tractors that would act as feeders until such time as they could extend the programme which they now had in hand. The Minister for Lands, referring to the purchase of road tractors, said they had had an offer from a firm, but as the scheme, if taken up, would be largely in the nature of a trial to see how it worked, the offer was such as did not meet with acceptance. The Government were now inquiring into the working of road tractors to see whether it would be a practicable proposition, but only then as a stopgap until they could extend their present railway programme.

AN INTERESTING CATALOGUE.—Sidney Straker and Squire, Limited, of Wilson Square, Blackfriars, London, have just issued a new descriptive catalogue of their industrial motor vehicles. The catalogue, which comprises some 48 pages, is well illustrated, and gives the reader a very good idea of the wide experience of the firm in all departments of the motor industry, including motor omnibuses of all types, chars-a-bancs, ambulance vans, tower wagons, motor lorries, motor vans, motor tramcars, and petrol locomotives. In their introductory remarks Messrs. Straker state that up to the present time they have supplied some 3,000 motor vehicles for various purposes, not less than 860 of these being for public service. A special feature of the catalogue is the inclusion of a number of interesting illustrations taken from photographs of Straker-Squire vehicles at work in various parts of the world. Specifications and particulars of each type are given, together with a considerable amount of information regarding the method of manufacture and conditions of sale.

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# MOTOR TRAFFIC.

## MOTOR TRAFFIC NOTES.

ELECTRICAL MAIL VANS.—The Austrian postal service recently began running 30 electric accumulator motor mail vans. A garage for 50 of these vehicles is in course of erection.

PARAFFIN FOR FIRE BRIGADE MOTORS.—The London Fire Brigade have for the last 12 months been using pure paraffin as motor fuel, with very satisfactory results. The cost has been about 7d. per gallon.

CONTINENTAL TYRES.—At the St. Petersburg Motor Show 63 per cent. of the solid tyres fitted to exhibits were the "T" pattern Continental tyres, made by the Continental Tyre and Rubber Company, Thurloe Place, London, S.W.

OMNIBUS LIFE-GUARD EXPERIMENTS.—The London General Omnibus Company have set up a special staff for the purpose of conducting experiments in connection with life-guards. The company are willing to suitably compensate persons who submit suggestions which the company ultimately adopt.

FURTHER COMPETITION AT CROYDON.—Messrs. Tilling on June 10 instituted an extension of their motor omnibus service from East London to Croydon. For a portion of the distance the new service competes with the tramways, as well as serving districts which have asked for tramway extensions.

INCREASED RAILWAY CHARGE FOR CARS AND OMNIBUSES. The railway companies of the United Kingdom on July 1 instituted a new scale of charges for warehouse rent, wharfage, and labour applicable to merchandise traffic. Motor cars, omnibuses, and tramway cars, irrespective of weight, now pay 1s. 6d. each per ton, against 1s. hitherto paid.

A YEAR'S OMNIBUS WORKING AT NEWCASTLE.—The Tilling-Stevens omnibuses, running to Westerhope in connection with the Newcastle-on-Tyne Corporation Tramways, have been running a year. Councillor Rodgers, chairman of the Tramways Committee, has stated that the vehicles have traversed 48,000 miles. The service acted as a feeder to the tramways.

MUNICIPAL UTILITY MOTORS.—The Westminster City Council are to add four more motor wagons to their fleet of 20. Before coming to this decision the Council received a report stating that the surveyor had found on a tonnage basis that one motor wagon was the equivalent of 4·12 horses. The cost per ton by motor wagon was 2s. 9 28d. as compared with 3s. 10·12d. for horse vehicles.

COMMERCIAL VEHICLE EXHIBITION.—Our advertisement columns contain an announcement of the Commercial Vehicle Exhibition, which is to be held at Olympia from July 18 to 26 inclusive. Prince Arthur of Connaught will perform the opening ceremony. Some years have elapsed since a similar show was held in London under the auspices of the Society of Motor Manufacturers and Traders, and the importance of the present one is enhanced by the Imperial Motor Conference which is to take place concurrently.

ROTARY OR TURBINE INTERNAL COMBUSTION ENGINE.—Mr. W. Worby Beaumont's offer of a challenge cup or plate for the best practically useful rotary or turbine internal combustion engine, applied to a motor vehicle and entered for trial under Royal A.C. Regulations in 1915, has been accepted with thanks by the committee. The committee decided that under the term "rotary" would be excluded all engines with essential reciprocating parts, and that the award should be made or withheld at the discretion of the committee.

WITHDRAWAL OF REDUCED FARES ON NON-COMPETITIVE ROUTES.—By 16 votes to 11 Walthamstow Council have suspended the issue of return tickets at reduced fares on the St. James Street and Forest Road routes, where there is no motor omnibus competition with the tramways. On the first-mentioned route, in 28 days, there was an increase over the corresponding period of last year of 20,480 passengers, of whom 16,232 travelled by ordinary tickets. The gain in receipts was £34. The Forest Road route showed a gain of 9,006 passengers, and a loss of £32.

ROADS IMPROVEMENT ASSOCIATION.—The unsatisfactory road surfaces in suburban parts of London has been discussed, and the association has resolved to obtain data and initiate a campaign for their systematic improvement. On the question of altering the rule of the footpath to correspond with that of the road, in connection with a report received from the Road Users' Conference, the council have unanimously resolved, as hitherto, to recommend the alteration. This would necessitate pedestrians facing approaching traffic, and would force upon them the need to take care before stepping off the footpath.

BRITISH MOTOR CAB DIVIDEND.—The directors report for the 12 months ended March 31 that, after adequately providing for depreciation of rolling stock and other assets and putting aside a sufficient sum to cover all outstanding claims, there remains a balance of £24,069, of which they propose to utilise £19,925 in paying a dividend of 5 per cent. on the preferred ordinary shares. As the result of the settlement of the 10 weeks' strike of drivers the company have to bear the increased cost of petrol, but it is hoped that the profits which will be received from the receipts of the new cabs which are being built will, to some extent, compensate for this.

WIDTH OF LOADS ON MOTOR VEHICLES.—In his annual report Mr. Mozley, manager of the Burnley Corporation Tramways, says: "Considerable delay to the cars has been experienced owing to the inability of heavy locomotives to climb gradients. The matter has been referred to the town clerk with a view to removing the difficulty. A defect in the Motor Car Order of 1904 with respect to the width of loads which light locomotives are permitted to carry is receiving the attention of those concerned. The Order, whilst allowing a vehicle to be 7 ft. 6 in. wide, apparantly places no restriction on the width of the load, and in some cases it is found that loads measuring 10 ft. 6 in. are carried, which are a serious obstruction to the cars."

MOTOR OMNIBUSES FOR WARRINGTON CORPORATION.—By the courtesy of the makers, Messrs. W. A. Stevens and Company, Limited, a representative of THE TRAMWAY AND RAILWAY WORLD was enabled

to take the photograph reproduced above of the first Stevens-Tilling petrol-electric omnibus for Warrington Corporation. This omnibus has the well-known characteristics of the machines manufactured at Maidstone, and will no doubt give satisfactory results.

OMNIBUSES AND MANCHESTER'S LATE SERVICE PROBLEM.—Manchester Tramways Committee are extending the service of motor omnibuses from Palatine Road terminus and Northenden, and if the experiment is successful these vehicles will be used to connect the same terminus with Didsbury and Cheadle. The committee have four 'buses ready for use, and an extended trial on June 17 proved highly satisfactory. Alderman Bowes, chairman of the committee, interviewed in regard to the demand for an all-night tramway service, has stated that probably when it is seen how the motor 'buses work in the Northenden and Cheadle districts the committee will try the experiment of running such 'buses on selected routes for the benefit of people who are kept at work until past midnight.

INDIAN RAILWAYS AND ROAD MOTOR VEHICLES.—The railway authorities of Bengal, Bombay, and Madras are being urged to provide services of road motor vehicles in areas where the construction of railways is out of the question. Motor goods lorries are operated in Madras City. What Sir Henry McCullum, ex Governor of Ceylon, has accomplished in that island is quoted as an incentive. No fewer than 286 miles of new roads were constructed, and many existing roads were improved. The sum of Rs.18,000,000 was expended on the introduction of motor services as an adjunct to the railways. The Government of Ceylon have also introduced a motor mail service, and induced planters to invest in motor vehicles. The island, it is stated, has not yet solved the problem of the right kind of motor vehicle.

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THE

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## NOTICES.

All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

## WEEKLY LIST OF TENDERS INVITED.

### THE GREAT INDIAN PENINSULAR RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply and delivery of the following Stores, namely :—

Railway Tickets, etc.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in sealed envelopes, addressed to the undersigned, marked "Tender for Railway Tickets, etc.," or as the case may be, not later than 11 o'clock a.m. on Thursday, July 17, 1913.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, E.C.,
July 9, 1913.

### PEMBROKE URBAN DISTRICT COUNCIL, CO. DUBLIN.

The Pembroke Urban District Council are prepared to receive tenders for Alterations and Extensions to Existing Switchboards at the Tramways Office, Municipal Buildings, Aberdeen.

Specification and form of tender may be obtained at the Town Hall, Balls Bridge, Co Dublin, any day during office hours on payment of two shillings and sixpence, which will not be refunded.

The contractor shall, if required, enter into a regular signed contract, and give security by bond for carrying out the work. The contractor must bear the expenses of contract and bond.

Tenders must be delivered at the Town Hall, Balls Bridge, Co. Dublin, not later than noon on Saturday, July 26, 1913, addressed to the Chairman of the Council.

The Council will not be bound to accept the lowest or any tender.

By order, J. C. MANLY,
Clerk to the Council.

Town Hall, Balls Bridge, Co. Dublin,
Dated July 9, 1913.

### BOROUGH OF TODMORDEN.

The Council of the above Borough invite tenders for :—

Section A.—Converting Plant for 300 kw.
" B.—H.T. Switchboards.
" C.—H.T. Cables.
" D.—Mechanical Stokers.
" E.—Superheaters.

Particulars may be obtained from Mr. Joseph Boyce, Borough Electrical Engineer, Electricity Works, Todmorden.

The tenders will be subject to the sanction of the Local Government Board being obtained for borrowing powers.

Tenders to be sent to the undersigned on or before July 26, 1913, marked "Electricity, Tender for Section —."

J. E. SUTCLIFFE,
Town Clerk.

Town Hall, Todmorden,
July 8, 1913.

### CITY OF ABERDEEN.

TRAMWAY DEPARTMENT.

UNIFORM CLOTHING FOR TRAMWAY EMPLOYEES.

The Corporation of Aberdeen are prepared to receive tenders for the supply of Uniform Clothing and Caps for Inspectors, Motormen, Conductors, and Parcel Boys.

Forms of tender may be had on application to the undersigned at the Tramways Office, Municipal Buildings, Aberdeen.

Tenders must be made on the forms provided, and must be handed in not later than 12 o'clock noon on Tuesday, July 22, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

The contractors will be required to pay not less than the standard rate of wages relating to the particular trades to which this specification applies.

R. STUART PILCHER,
General Manager.

Corporation Tramways Office,
Municipal Buildings, Aberdeen,
July 11, 1913.

### SHIPLEY URBAN DISTRICT COUNCIL.

The Shipley Urban District Council invite tenders for the supply, delivery, and erection of the following plant :—

(A) Two 1,000 kw. Steam Turbines.
(B) Two 1,000 kw. Alternators.
(C) Two Surface Condensers (for above plant).
(D) One Controlling Switchboard.

Copies of specifications, general conditions, etc., can be obtained from Mr. W. Redman, the Council's Electrical Engineer, Dockfield Works, Shipley, on the payment of two guineas, which will be returned on receipt of a *bonâ-fide* tender. The Council do not bind themselves to accept the lowest or any tender.

Sealed tenders, endorsed "Electrical Plant," to be delivered to the undersigned on or before Tuesday, July 22, 1913.

I. LINDOW,
Clerk to the Council.

Manor House, Shipley,
July 5, 1913.

### THE SOUTH INDIAN RAILWAY COMPANY, LTD.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of :—

1. Carriage Fittings;
2. Files;
3. Locks and Padlocks;
4. Rivets, Nuts, etc.;
5. Steel Rails and Fishplates
   Rails 41¼lb., about 716 tons
   Fishplates for above rails about 28 tons.

Specifications and forms of tender may be obtained at the Company's Offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Carriage Fittings," or as the case may be, must be left with the undersigned not later than 1 o'clock on Wednesday, July 23, 1913.

The Company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of specifications Nos. 1, 2, 3, and 4, and 20s. for each copy of No. 5.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.

By order, NEVILLE PRIESTLEY,
Managing Director.

Company's Offices,
91, York Street, Westminster, S.W.,
July 8, 1913.

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## COUNTY OF LONDON.

The London County Council invites tenders for the supply, etc., of High and Low Tension Switchgear required for various Tramways Sub-Stations.

Persons desiring to submit tenders may obtain the specifications, form of tender, etc., on application to the Clerk of the Council at the County Hall, Spring Gardens, S.W., upon payment to the Cashier of the Council of the sum of £2. This amount will be returnable only if the tenderer shall have sent in a *bonâ-fide* tender and shall not have withdrawn the same. Full particulars of the work may be obtained on personal application, and the drawings, specification, and other contract documents may be inspected at the County Hall before the payment of the fee.

The contractor will be bound to pay to all workmen employed by him in and about the execution of the contract, or any part thereof, wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list, and such rates of wages and hours of labour will be inserted in and form part of the contract by way of schedule. Full particulars of the Council's Standing Orders on these matters are given in the *London County Council Gazette*.

Tenders must be upon the official forms, and the instructions therein must be strictly complied with. No tender received after 11 a.m. on Tuesday, July 22, 1913, will be considered.

The Council does not bind itself to accept the lowest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
July 7, 1913.

## WANTED.

### DOUBLE-DECK CAR.

Wanted—Small Double-Deck Car, 4ft. 8½in. gauge, G.E. 58 Motors, B. 18 Controllers. Must be in good condition. Full particulars to Manager, Electricity Works, Glossop.

## WANTED.

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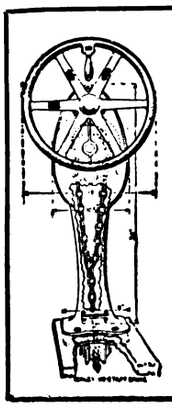

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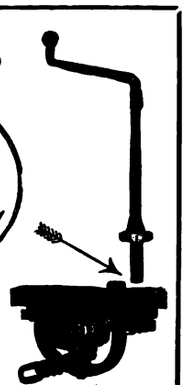


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THE
# Tramway AND Railway World

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SATURDAY, JULY 12, 1913.

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## INCREASING NEED FOR A TRAFFIC BOARD.

The Select Committee of the House of Commons on motor traffic in London are now approaching the end of their work, and it is to be hoped that their report will be completed and published before the present session ends in August. The question which is now everywhere discussed in tramway and motor circles is, will the Committee recommend the creation of a Traffic Board? As the result of the agitation which arose at the end of last and the beginning of this year in consequence of the alarming growth in the number of accidents caused by motor vehicles and particularly by omnibuses, the Committee were appointed for the purpose of investigating the whole subject. The question of the causes of accidents is, however, intimately mixed up with that of street traffic and its regulation, so that the inquiry has ranged over rather a large field. To a small extent it has covered some of the ground surveyed by the Royal Commission on London traffic in 1905. As reports of the proceedings published in these pages from time to time show, tramway traffic and accidents were also investigated, and the evidence given by Mr. A. L. C. Fell and others emphasised the fact that tramways are much less productive of accidents to pedestrians than are motor omnibuses. Besides following the fixed path of the rails, the tramcar has the advantage of an efficient lifeguard. It was again shown by expert testimony that no practical lifeguard for the front of an omnibus has yet been devised. The side-guards to the rear wheels should prove useful, as many fatalities have been caused by the rear wheels. Witnesses for the omnibus companies did not appear to have anything very definite to suggest for the prevention of accidents, except the thorough training of drivers and the inculcation of caution. They did not favour paying the drivers by the day or week instead of by the journey, but there seems to be no doubt that in the public interest such a change should be made. The latter method would tend to minimise the inclination of drivers to take risks in order to make up for delays. What would be said if any tramway undertaking began to pay its drivers by the journey? The sooner the journey method is abolished the better. Evidence given by the police and by Government departments made it clearer than ever before that all these bodies are quite helpless in the matter of traffic regulation and control. Too many departments have powers and all the powers are limited. Many of the witnesses before the Committee advocated the formation of a Traffic Authority of some kind with full powers of control. This is following on the lines of the recommendation of the Royal Commission for a Traffic Board—a recommendation which the Government have steadfastly refused to carry out. If the present Committee recommend the formation of such a body the Government may at last be induced to move. Such a Board among other things should have the licensing of all vehicles plying for hire and should be able to limit the number of omnibuses where necessary, to prescribe routes which they may follow and those which they may not follow, and to set up some co-ordination between tramway and omnibus services. A few days ago the Prime Minister was urged by representatives of architects', surveyors', and engineers' institutions and of about fifty local authorities to appoint a general authority for the metropolis to co-ordinate suburban town-planning schemes so that the recommendations of the Royal Commission for the construction of main arterial roads through new districts might be carried out. This is only another branch of the work which should be entrusted to a Traffic Board. Mr. Asquith seemed impressed and promised to consider the matter further. It is to be hoped that he will be aided in his consideration by a strong report from the Select Committee.

## STUDY OF AMERICAN METHODS.

The spread of electric tramways in this country has had not a little to do with breaking down the old insular notion that Great Britain had nothing to learn from other nations. Now that tramways have been in operation in the British Isles for years, the cheap and frequent facilities which they afford have enlarged the inhabited area of towns and cities, thus throwing into the thoroughfares of the central termini a volume of traffic that in some instances is calling for the relief of congestion. Manchester is the first place to consider the question of remedial measures, and during the past eighteen months the tramways manager has prepared a valuable report which sets forth the conditions that have to be faced in that city. In order more fully to indicate the methods of relief, Mr. McElroy and Mr. H. Mattinson, the permanent-way engineer, on May 17, set out on a visit to the United States and Canada, in order to study up-to-date methods of street traction. In the first-mentioned country during the past decade a number of cities have resorted to subway and overhead tracks. The two officials returned to Manchester during the first week of the present month, after visiting New York, Boston, Newark, Pittsburg, Chicago, Toronto, and Montreal, a distance of nine thousand miles. This week the Glasgow Tramways Committee recommended that Mr. Dalrymple should journey to the leading cities of America, with a view to studying recent methods of tramway traction. The Glasgow manager already has an extensive acquaintance with American systems, for about seven years ago the Corporation permitted him to advise the authorities of Chicago on the question of municipalising

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their transit facilities. Both the Manchester and Glasgow reports may be expected to contain some reference to the development during the past few years of Edison battery vehicles both for rail and street traction. The Glasgow electrical engineer is already experimenting in the work of his department with one of these batteries supplied by the Edison representatives in this country, and the Liverpool Tramways Committee are investigating the possibility of the system being utilised as a means of relieving the congestion experienced in the goods traffic from the docks. In the course of a conversation with newspaper representatives, Mr. McElroy stated that he and his colleague have obtained a great deal of information which will be of value to the Corporation in the solution of the serious problem they have in hand. Although the means of transit in the United States are in the hands of companies, they are subject to regulations and control by Commissioners, who act on behalf of the public. The method of appointing the Commissioners varies considerably in the various States, but usually they are appointed by the Governor of each State and by the municipality jointly. They are, of course, paid officials, and have some special qualification for their work. On the whole, these boards have proved exceedingly useful, and their co-ordinating and moderating influence has produced results that have greatly benefited the public. This American experience is of importance, in view of the efforts now being made to induce the Government to carry out the recommendations of the Royal Commission on London Traffic for the establishment of a Traffic Board. It is remarkable that in this country we have been so slow to appreciate the necessity of some unifying authority in a field where so much complexity exists as in metropolitan transport. Nothing but the blighting influence of party politics could so long have prevented the institution of an authority so urgently required.

## LONDON TRAMWAYS RENEWAL FUND.

NO SUM AVAILABLE—QUESTION ADJOURNED FOR TWO YEARS.

At the meeting of London County Council on Tuesday last, the Highways Committee presented a special report on the subject of the tramways renewal fund and general reserve fund. They pointed out that on June 23, 1908, the Council decided that provision should be made for renewals in respect of the tramways undertaking at the rate of two-thirds of a penny per car mile, and that the question of the adequacy of this provision should again be considered at the expiration of five years. The provision of two-thirds of a penny was the result of a careful computation based on the lives of certain parts of the undertaking consisting of the permanent way, cables, machinery at Greenwich station, petrol motor cars, petrol lorries, steam lorries, ticket vans, cable vans, and sundry horse vehicles. No provision was made in respect of renewal of cars, car traversers, cable ducts, tracks in the car sheds and foundations for the permanent way and the renewal of certain sub-station machinery, switchgear and sundry plant and tools, as work of this nature is paid for directly out of revenue. Of a total expenditure to March 31 last of £7,521,030 on items the repayment of which was spread over 25 years, only about £2,074,000 was covered by the renewals fund, the remainder being renewed out of revenue account.

The recent falling off in traffic receipts owing to the great increase in motor omnibus competition had the effect of bringing to a negligible figure the surplus for 1912-13 to be added to the renewals fund, and the surplus for the current year would be very small unless conditions were materially altered. The question of the rate per car mile required became therefore for the moment an academic one. At the same time it was desirable to review the position. Taking the capital cost of the items for which renewals provision should be made, and providing (by cumulative annuity) for the renewal, the annual provision would be as cited below.

| | Annual provision for the renewal. | Amount per car mile. * |
|---|---|---|
| | £ | d. |
| Permanent way—Surface work only, excluding slot rails, but including electrical equipment | 116,304 | .498 |
| Generating station machinery and plant | 13,235 | .057 |
| Sub-station machinery and plant | 6,566 | .028 |
| Cables and feeder pillars | 9,497 | .041 |
| Machinery and plant in central car repair depot and other depots | 1,319 | .006 |
| Motor cars, lorries, wagons, carts, etc. | 1,182 | .005 |
| Total | £148,103 | .635 |

* Based on 56,000,000 miles.

It was very difficult to estimate the amount required for renewals beyond the next five years, but it was considered that an average expenditure of about £139,000 a year, equal to .595d. per car mile, would be sufficient. On March 31 last the renewals fund amounted to £633,010, while in addition there was the general reserve fund amounting to £273,786. In view of the impracticability under existing conditions of estimating the amount that would be available for renewals there appeared to be no practical advantage in revising the basis at present, and the Committee were of opinion that there should be carried to the renewals fund the actual surplus each year, leaving the question of a possible revision of the basis for a further period of two years. In regard to the reserve fund, nothing was available to be carried to it for the year 1912-13, and it was not estimated that there would be any sum available for the year 1913-14. It therefore did not appear necessary that any decision as to the constitution of this fund should be come to at present. The Finance Committee agreed with the Highways Committee, and said that they had adjourned the matter of the reserve fund for two years.

The Council debated this report at considerable length, but no new facts were disclosed. The policy recommended by the Committees was eventually approved.

## PRESENTATION TO MR. H. E. BLAIN.

A largely attended gathering of the West Ham tramways official staff and friends took part in a farewell social to Mr. and Mrs. H. E. Blain, on Wednesday evening last, in the recreation room of the tramways depôt. Mr. Blain was presented with a large and exceedingly handsome silver-mounted polished-oak case, containing a three-bottle tantalus, with accompanying glasses, a card outfit, and a smoker's compendium, duly stocked. The presentation was made on behalf of the official staff by Mr. F. Eggington, the principal assistant, who referred in feeling terms to the relationship between Mr. Blain and the members of the staff, and expressed their deep sorrow at his departure from West Ham, whilst heartily congratulating him upon his new appointment with the London underground railways. Mr. Blain, in acknowledging the presentation, said that it had come as a complete surprise to him, and that he would value the gift as a most kindly remembrance of ten years' work in that busy borough. He thanked Mr. Eggington and the staff for their support, and extended in their name as well as his own a very warm and hearty welcome to the new tramways manager, Mr. J. S. D. Moffet, of Rochdale, whom he described as a capable, straight, and courteous gentleman, and whom he sincerely wished a happy and prosperous time in West Ham. Mr. Moffet, who was present with his wife at the function, replied in suitable terms, thanking the staff for their welcome, and appealing for their loyal support, which he promised to do everything possible to deserve.

Mr. J. W. Beauchamp, the borough electrical engineer of West Ham, referred to the personal loss he felt he was sustaining in the departure of Mr. Blain, and testified to the valuable assistance he and his predecessors had received from him in the work of the sister trading department. Mr. W. C. Ullmann, tramways manager, East Ham, also voiced the regret felt in the tramway world, particularly amongst the managers of the Metropolitan area, at the change Mr. Blain was making, but cordially wished him success in his new sphere.

## METROPOLITAN ASSOCIATION OF ELECTRIC TRAMWAYS MANAGERS.

The members of the above Association on Friday evening, July 4, entertained Mr. H. E. Blain, their late chairman, at dinner at the Municipal and County Club, Whitehall Court, S.W., when there were present Messrs. Ullmann (East Ham), vice-chairman, Fell and Bruce (London County Council), Schofield (Leyton), Harvey (Ilford), Coveney (Erith), Stokes (Bexley), Murray (Walthamstow), Hammond (M.E.T.), Mason (South Metropolitan), and Goodyer (Croydon), hon. secretary. Mr. H. England (Wakefield) was also present.

Mr. W. C. Ullmann, in proposing the toast of the evening, and expressing the general regret of all present at the circumstances which had brought about Mr. Blain's severance from Metropolitan Municipal Tramways operation, and, more particularly, his connection with their Association, of which he was the chairman and prime founder, spoke feelingly of the many excellent qualities possessed by their guest. He stated that no tramways manager in the Metropolitan area had done more to support the usefulness of the Association, and the cordial relations between its members, than Mr. Blain.

Mr. T. B. Goodyer, in expressing his agreement with what Mr. Ullmann had said, remarked that, as hon. secretary of the Association for several years past, and in connection with many other matters, he had been in very close touch with Mr. Blain, and, personally, would look upon his departure as a personal loss. In congratulating him upon his new appointment, he said that his new employers would find they had gained a "real live man."

Mr. Fell, Mr. Bruce, Mr. England and others also bore testimony to the high esteem in which Mr. Blain was held.

**The Metropolitan Electric Tramways Athletic and Social Club** will hold their annual sports meeting at the Black Bull, Whetstone, on Thursday, July 17.

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## PRIVATE BILL LEGISLATION.

MEXBOROUGH AND SWINTON RAILLESS TRACTION.—The local Tramways Company's Bill, which had passed the House of Commons, came before Lord Newton's Committee of the House of Lords on July 10-11. The proposals were for a route from Mexborough to Conisborough, and from Mexborough to Bolton Road. Mr. W. B. Cownie, managing director of the company, spoke of the advantage the routes would be to the district, particularly to the miners. The local authorities were always quarrelling, and were not likely to agree on a scheme. Mr. Wedderburn, K.C., said that, subject to the approval of the ratepayers, Mexborough would undertake to promote a Bill next year.

RHONDDA RAILLESS TRACTION.—Following its passage through the House of Commons the National Electric Construction Company's Railless Traction Bill on July 7-8 was considered by a Committee of the House of Lords, presided over by Lord Ribblesdale. In reply to the Chairman, Mr. Knox, K.C., admitted that the undertaking was a by-product of the Rhondda Tramways Company. Mr. J. E. Waller and Mr. W. B. Cownie gave evidence, the latter stating that if conditions were put upon the company which would prevent them geting a clear 5 per cent. on their capital expenditure, they could not go on with the undertaking. He did not think the scheme could stand the contribution of three-eighths of a penny per car mile. On behalf of Llantrisant Council an effort was made to induce the Committee to impose further responsibilities in addition to a contribution of £1,333 which they are to be required to make. The Committee decided that the Bill might proceed as it was, and refused to grant the Llantrisant Council powers to purchase. Having approved the other clauses, the Committee ordered the Bill to be reported for third reading.

## L.C.C. TRAMWAY MATTERS.

ADVERTISING OF TRAMWAY SERVICES.

At last Tuesday's meeting of the London County Council the Highways Committee reported that they had considered the question of advertising the facilities afforded by the tramways, and they suggested that illuminated advertisements should be displayed on certain tramway buildings and other sites. The Committee proposed to obtain tenders for the provision of the signs required from selected firms.

RECONSTRUCTION OF HORSE TRAMWAYS.

In the opinion of the Committee steps should be taken to carry out reconstruction for electric traction of the horse tramways in Ball's Pond Road between Southgate Road and Kingsland Road, a distance of about one-third of a mile. They proposed that tenders should be invited from firms at present carrying out tramway work for the Council.

TRAMCAR V. OMNIBUS.

The Committee reported an interesting case. On May 16 last William Banks, a driver, employed by the London General Omnibus Company, stopped his omnibus suddenly without any warning on the tramway track at East Ham Town Hall. The driver of one of the County Council's tramcars which was following had to apply his brakes sharply to avoid a collision, thus causing the conductor to be thrown against the doorway. The tram driver sounded his gong, and although there was room on the near side for the omnibus no notice was taken, and when the omnibus was eventually driven to the near side the car had been delayed for three minutes. The omnibus driver was asked for particulars, but refused his name and address until a constable was called, which caused a further delay of five minutes. Summonses were subsequently issued against the omnibus driver for driving to the common danger, under the Motor Car Act of 1903, and for obstructing the Council's car. He was fined £3 under the first and £1 under the second summons, and was ordered to pay 15s. costs to the Council.

INTERNATIONAL TRAMWAYS CONGRESS.

The General Purposes Committee reported that the Highways Committee were of opinion that the Council should become a member of the International Tramways Congress, and had asked that their chairman or vice-chairman should be appointed to represent the Council at the Congress to be held in 1914. The expenditure involved was £12 for the annual subscription. The General Purposes Committee accordingly recommended that the Council should become a member of the Congress, and that the chairman or vice-chairman of the Highways Committee represent the Council at the Congress.

The various recommendations were adopted.

LIVERPOOL ROAD TRAMWAYS.

Considerable debate took place on an adjourned report of the Highways Committee recommending the discontinuance of the horse tramways car service in Liverpool Road, Islington, and eventually Sir Edward White accepted an addition to the recommendation proposed by Mr. H. H. Gordon as follows:—"And that it be an instruction to the Committee to consider and report as to the desirableness of utilising the Liverpool Road route as part of a through route for cars between the City and Highgate and other northern termini."

**Bell Boys on Manchester Cars.**—A correspondent of a London newspaper has written in terms of high praise of the Manchester tramways. Amongst other things he mentions that on all the busy routes a car has not only the conductor but also a youth whose business it is to stop the car when required, and to be on the look-out for passengers.

## MISCELLANEOUS NEWS AND NOTES.

**A Petrol Tramcar for Stirling.**—Subject to the consent of the local authorities being given the Board of Trade have authorised the use, as an experiment, of a petrol-propelled tramcar on the system of the Stirling and Bridge of Allan Tramways Company.

**Tramwaymen's Tug-of-War Championship.**—At the annual sports promoted by the London United Tramways Athletic Club, at Brentford, on July 9, was decided a tug-of-war, open to the tramways of the United Kingdom, for the Lady Robinson Challenge Cup. Result:—First round: London United (Hanwell) beat City of Hull Tramways by 2 pulls to 1; London United (Fulwell) beat Bournemouth Tramways by 2 pulls to nil. Final: Hanwell beat Fulwell by 2 pulls to nil.

**Three Halfpenny Stages in a Penny Ride.**—Replying to a question at a meeting of Manchester Corporation, on July 2, as to why halfpenny fares had not been adopted throughout the city, Alderman H. Brown said that the committee wished to find out what the result would be of dividing penny fares into two or three halfpenny fares. In the course of two or three months they would know whether they ought to launch out and divide the penny fares into two halfpenny or three halfpenny fares.

**Illuminated Cars at Manchester and Oldham.**—On the occasion of the visit of the King and Queen to Manchester on Monday next, a decorated and illuminated tramcar will run over the principal tramways in the evening, and also on Tuesday evening. An illuminated car, followed by a decorated King George V. car, will run at Oldham this (Saturday) evening and also on Monday. On the suggestion of the manager, the tramwaymen in this town are to receive double wages for working on July 12, while men not on duty will receive a day's wages.

**Concessions to Reading Employees.**—Recently, Mr. G. F. Craven, the general manager of the Reading Corporation tramways, interviewed a deputation of motormen and conductors, who desired him to put before the Tramways Committee several requests relating to their pay on Bank holidays and Sundays, and also the rate of pay of conductors acting as motormen. The result of this was that the July meeting of the Council approved the Tramways Committee's recommendations to pay motormen and conductors at the rate of double time on Christmas Day and time and a half on Good Friday, and to pay conductors acting as motormen at the rate of 5¾d. per hour during the first year, 6d. per hour for the next six months, 6¼d. for the following year, rising at the end of 2½ years to 6½d. The Council further agreed to allow the conductors an increase in their reporting time of five minutes.

**Trackless Car and Omnibus Scheme for Reading.**—Some months ago a sub-committee was formed to consider the advisability of extending the tramways by establishing either a motor omnibus service or a trackless trolley system, chiefly to serve the districts incorporated in the borough of Reading. The sub-committee recently presented the report to the Tramways Committee, who approved of the proposals, and, with an extensive report by the tramways manager, submitted it to the Council on July 4 for their consideration. The total scheme comprises a tramways extension of about a quarter of a mile, and four trackless trolley routes of slightly more than eight miles total length, with a further provision for motor omnibuses for trying new routes. The total cost of the scheme is over £26,000, and the Council decided that it was necessary to go into Committee over the question and arranged for a meeting on July 10.

**Competition in Oldham.**—The Tramways Committee have discussed the question of carrying passengers on the initial and last journeys of the motor omnibuses from the depôt to Moorside and back. It was proposed to allow the public to travel from the Star Inn to the Moorside tramway terminus and *vice versa* for a six-penny fare. It was contended by several members of the Committee that the 'buses would not secure passengers at that fare, and the Chairman explained that the Committee did not want to rob the tramway service, but he knew many people who would pay that fare. The manager (Mr. Dugdale) explained that people paid 2d., 3d., and 4d. to ride in wagonettes from Moorside to Grains Bar and that while the motor 'buses were running. If the Committee charged the ordinary car fare people would hang back for the motors, and the cars would be running empty in the meantime, because there was no scheduled time for starting. They went by the amount of traffic. The Committee decided to charge 3d. and 6d. fares.

**Commercial Motor Vehicle Exhibition.**—Only a few of the Municipal Tramway Committees have as yet appointed representatives to attend the Commercial Motor Vehicle Exhibition, which will be held at Olympia from Friday next, July 18, to Saturday, July 26. Among those who propose to attend are Mr. Wm. Clough (Bury); Alderman Shentall, chairman, Councillor Clayton, vice-chairman, Councillor Clark, and Mr. R. L. Acland, engineer and manager (Chesterfield); Mr. T. B. Goodyer, general manager (Croydon); Alderman C. Northfield, Mayor of East Ham, Alderman O. R. Anstead, chairman of the Works Committee, and Mr. J. E. W. Birch, borough engineer and surveyor (East Ham); Mr. A. Coveney, general manager (Erith); Mr. L. E. Harvey, general manager (Ilford); Mr. Frank Ayton, chief engineer and manager (Ipswich); Mr. J. Gottschalk, general manager (Northampton); Councillor R. H. Swain, chairman, and Mr. J. Aldworth, general manager (Nottingham), Mr. J. W. Dugdale, general manager (Oldham); Mr. A. R. Fearnley, general manager (Sheffield); Councillor J. Farley, chairman, and Mr. R. R. Greene, general manager (Wallasey); Mr. R. L. Horsfield, general manager (Walsall); Mr. W. A. Luntley, general manager (Wolverhampton).

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**Request for Illuminated Indicators.**—Stoke-on-Trent Council have called the attention of the Tramway Company to the desirability of each car being fitted with an indicator capable of being illuminated at night, stating the destination or route of the car.

**Reopening of Glasgow Harbour Tunnels.**—The three tunnels under the Clyde which were closed in 1907 owing to ferry boat competition immediately above the line of the tunnels, were re-opened for traffic on July 1. There are three tunnels, two feet apart, all on the same level under the Clyde. The centre tunnel is intended for passenger traffic only, and meantime will not be in use. The west tunnel is used for north-going traffic, and the east for south-going traffic. There are six lifts in each shaft, but generally four lifts only are operated and one kept spare. An agreement has been arranged between the Tunnel Company and the Corporation for the reopening to take place for one year, with an option to the Corporation to purchase the undertaking for £100,000. Members of the Statute Labour Committee and the Tramways Committee attended the opening ceremony, and made an inspection of the works under the guidance of Mr. J. Dalrymple, the tramways manager, and the company's officials.

**The Trolley Wire Design Action.**—Vice-Chancellor Smith, K.C., on July 8 gave his decision in the case in which the British Insulated and Helsby Cables, Limited, of Prescot, near Liverpool, sued the London Electric Wire Company and Smiths, Limited, of the Anaconda Works, Salford, for an alleged infringement of registered designs for wires for overhead trolley tramways, and asked for an injunction to restrain defendants from further use of their copyright. His Honour remarked that one of the designs was registered on March 7, 1908, and had been called in the case design A. The other was registered on April 9, 1908, and had been known as design B. Both wires were grooved, and were about half an inch broad between the lower shoulders at their broadest part, being rather less from the top of the semi-circle to the lowest part of the segment. Judging by the eye alone, to which test he was driven, he was unable to see such a distinction between plaintiffs' designs and the others as would enable him to say that plaintiffs' designs were novel. If design B was valid he held that there had been no infringement, and there would be judgment for defendants with costs.

**Inauguration of a Portsmouth Extension.**—Great interest was displayed at Portsmouth on July 4 at the opening of an extension of the tramways from the Recreation Ground and Commercial Road. The decision of the Council to construct tramways to the populous district of Stamshaw was mainly due to the efforts of Councillor J. Timpson, vice-chairman of the Tramways Committee, whose health was proposed by the Mayor (Alderman J. H. Corke), the chairman of the committee, during a few speeches following the inaugural ride. Mr. V. G. Lironi, the electrical and permanent way engineer, at the request of the mayor, described the work connected with the extension, which has cost £10,750, and details as to the service to be run were given by Mr. W. R. Spaven, the manager. Councillor Timpson paid a tribute to the work of Mr. Spaven, Mr. Lironi, and Mr. Roscoe, the assistant electrical engineer, and Mr. Lewis, the civil engineer, for the energy they had displayed in pushing on the work. He also proposed the health of the mayor, which was also heartily honoured. His worship was presented by Alderman Power with a basket of roses grown by Mr. H. Edmonds on waste land reclaimed by the Corporation, after it had been purchased by Alderman Corke and the late Sir W. King without consulting the Council.

**Croydon Tramway Sports.**—The annual sports meeting of Croydon Corporation Tramway Athletic Club took place on Wednesday of last week (July 2), and was as usual an interesting and enjoyable occasion. The Brighton Railway Athletic Club ground, where the sports were held, is one of the best in South London. Its situation gives extensive views, and with the fair weather that prevailed for the greater part of the afternoon the sports were witnessed in very pleasant conditions. About £150 in prizes, cups, and other trophies were offered for competition, and the numerous events were keenly contested. The tug-of-war teams were exceptionally well matched, and some heroic contests took place. The prizes were distributed by the Mayoress. Mr. T. B. Goodyer, the popular general manager of the Croydon tramways and president of the Athletic Club, entertained a large company to luncheon at Bennett's restaurant. The Mayor of Croydon in a few remarks alluded to the difficulties they were now passing through in Croydon owing to the competition of motor omnibuses, and mention there were 163 of these vehicles on the Croydon tramway routes against 75 tramway cars, which alone were amply sufficient to deal with the traffic. The motor omnibuses, however, made up their losses from large earnings in the central districts of London. It was unfair that the Council were obliged to maintain the streets for the omnibus service. He alluded to the excellent work which Mr. Goodyer had done in particularly trying circumstances, and spoke of the esteem in which he was held by the Tramways Committee. No tramway manager could do more than he was doing.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended July 5 amounted to £262,340, or £18,443 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £96 14s. 8d. per track mile, an increase of £5 0s. 11d. per mile as compared with last year.

## PERSONAL.

**Mr. J. S. D. Moffat,** general manager of Rochdale Corporation tramways, was on July 8 appointed tramways manager to the West Ham Corporation. The salary is £550 per annum, rising to £700.

**Mr. R. Cook,** for eleven years a conductor, motorman, and inspector on the Doncaster tramways, has been presented with a marble clock and bronzes by the electricity and tramways staff on his retirement to take up an appointment as wagon inspector at Bentley Colliery. Mr. G. A. Roberts, assistant engineer, made the presentation, in the absence of the electrical engineer.

**Mr. J. Barnard** has been unanimously appointed general manager of the Bolton tramways at a salary of £400, rising to a maximum of £600. Mr. Barnard was previously traffic manager. The vacant position of engineer and manager of the electricity department has been filled by the appointment of Mr. W. J. H. Wood at a salary of £400, rising by annual increments of £50 to £600. Mr. Wood had previously held the position of station engineer.

**Mr. J. Carter,** purchasing agent to the District, London Electric and Central London Railways, and to the London General Omnibus Company, died on Saturday last after a long illness.

## CONTRACTS AND ORDERS.

**Beecroft and Wrightman, Limited,** have received a contract to supply hard wood paving blocks to Bradford tramways.

**Mr. W. Dowling** has obtained a contract for the construction of a permanent way depôt for the Belfast tramways, at £2,066.

**Sturtevant Engineering Company, Limited,** are supplying a wet-air filter for turbo-generators to the Belfast electricity works, at £360.

**Walter Scott, Limited,** have been awarded a contract for the supply of Sandberg steel rails to Bournemouth tramways, at £5,535.

**St. Helens Council** have awarded a contract to the British Westinghouse Electric and Manufacturing Company, Limited, for a rotary converter.

**The M. and G. Truck and Engineering Company, Limited,** of 124 to 127, Minories, London, E.C., have received an order from Birmingham Corporation for maximum traction trucks for 75 cars.

**Commercial Cars, Limited,** of Luton, have orders in hand for motor passenger vehicles for Bath Electric Tramways, the Cheltenham Light Railway Company, and Grimsby Street Tramways.

**Leeds Tramways Committee** have recommended that the following tenders be accepted:—20 to 40 trucks for new cars, at £42 12s. 6d. each, J. G. Brill and Co.; 20 electrical equipments, with option to take a further 20, Dick, Kerr and Co.

**Doncaster Council** have allotted the following contracts:—Willans and Robinson, Limited, turbine and condenser, £3,308; British Westinghouse Company, Limited, one 350 kw. rotary converter, £1,074, and one 600 kw. rotary converter, £1,510.

**Manchester Council** have placed contracts as follow:—Foundations and floor extensions at engine house, etc., for 15,000 kw. turbo-generator, William Gornall; for cable, W. T. Henley's Telegraph Works Company, Limited, B.I. and Helsby Cables, Limited, C. Macintosh and Co., Limited, and the Electrical Engineering and Equipment Company, Limited; supply of pitch to the tramways department, Simons-Carves, Limited.

**Sheffield Council** have awarded the subjoined contracts:—Motor-driven surface condensing plant, capable of dealing with 75,000lb. of exhaust steam per hour, £2,647, and 10 per cent. allowance for contingencies, and with a further allowance of £100 for the old condenser, British Westinghouse Company, Limited; hand travelling crane of 15 tons capacity, £375, Chatteris Engineering Works Company; direct-acting boiler feed pump, £190, J. F. Hall and Son, Limited.

**London County Council** have accepted the following tenders:—Stern Sonneborn Oil Company, cylinder oil for Greenwich power station up to May 31, 1914, 1s. 5½d. a gallon, less 2½ per cent. monthly discount; C. Price and Co., machinery oil for Greenwich power station, £11 10s. a ton; W. Cory and Son, Limited, removal of ashes from Greenwich power station for one year from August 1 next, 1s. 3d. per cubic yard; W. T. Henley's Telegraph Works Company, Limited, 880 yards of low tension vulcanised bitumen insulated cable, £212 13s. 4d.; British Insulated and Helsby Cables, 50 cwts. of D.C.C., H.C.C. wire, £221 13s. 4d.

**St. Petersburg Tramway Extensions.**—On June 25 St. Petersburg Council awarded contracts as follow for the construction of new tramways during 1914-15:—

(1) To the Kolomensk house for excavations, rectification of streets, and construction of the lines, if they will accept the reduced price of 4,081,040 roubles (£425,500). Failing agreement with this offer, fresh tenders will be called for, and should these not induce lower offers, the work will be done under the direction of the town (2) To the A.E.G. for the construction of the cable ways and cable systems at 1,229,000 roubles (£130,000 and for aerial cables at 1,164,326 roubles (£123,000), and for the equipment of the Polvustrovsky sub-station if the house will accept 101,651 roubles (£10,700), failing which the order will go to the Dynamo Company. (3) To the Dynamo Company for the supplementary equipment of the St. Petersburg and Podyatchesky sub-station at 115,000 roubles (£12,200).

As to the rolling stock orders already published, there is a likelihood that the order for trailers will be withheld from the Swedish house and given to a Russian one, owing to the protests raised against the order going abroad. The difference in favour of the Swedish tender is 47,000 roubles (£5,000) on a total of 1,026,000 roubles (£108,000). The Russian Metallurgical Combine, Prodameta, will supply the rails at a maximum of 1,250,435 roubles (£132,000) and the house of Pomerantr will supply the sleepers at a cost of 218,381 roubles (£23,100).

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**Glasgow Council** have been recommended to accept the following tenders :—Special trackwork, Lorain Steel Company and E. Allen and Co.; ten-ton travelling crane for Whitevale sub-station, Chambers, Scott and Co.; teak planks, J. Watt Torrance and Co. and Robinson Dunn and Co.; mica, Micanite and Insulators Company, Limited; condenser for a new turbine at Pinketon power station, Messrs. Willans and Robinson; engine, J. Jackson and Co. For the supply of tramway stores the following contracts have been made :—E. W. Bliss Company and W. C. Yuille and Co., gear wheels; W. MacFarlane and Co., c.i. gutters; British Westinghouse Company, car equipments, motors, etc.; British Thomson-Houston Company, car equipments and controllers.

## FINANCIAL REPORTS AND MEETINGS.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended July 4 amounted to £53,069. Upon such of the lines as were working both last year and this year the receipts show an increase of £4,180 upon the week.

**Capetown Consolidated Tramways and Land.**—A balance of £1,678 is shown to the debit of profit and loss account for the current year, which, added to the balance brought forward from 1911 of £4,628, makes a total of £6,306 to be carried forward. No dividends have been declared by the subsidiary companies during the past year. The Camps Bay Tramway Company shows a profit of £2,973 for the same period. The Cape Provincial Government has taken the initiative in formulating a scheme for the unification of the municipalities of the Cape Peninsula—such unification will, in all probability, embrace Camps Bay. The whole matter is now under negotiation.

**Coventry Corporation Tramways.**—The statement of accounts issued by the tramways department of Coventry Corporation covers a period of fifteen months ending March 31, 1913, the full period since the Corporation acquired the tramways from the company. The report for the past twelve months shows that there was a total expenditure of £24,118 (or 5.822d. per car mile) and the gross profit was £15,035 (or 3.629d. per car mile). The total earnings were £39,153 (or 9.451d. per car mile). The percentage of working expenses to receipts was 61.6. The gross profit for the three months ended March 31, 1912, amounted to £2,949, making a total gross profit for the fifteen months of £17,984. This amount has been appropriated as follows :—Interest, £10,379; sinking fund (eight months), £3,286; reserve in lieu of sinking fund for seven months, £2,875; balance, £1,443. The total capital expenditure stands at £211,208, and the Corporation have 15¼ miles of track and 40 cars. During twelve months the energy consumption for all purposes amounted to 1,533,212 units, the cost per unit being .450d. The consumption per car mile was 1.44 units. The total number of car miles for the year was 904,207, and the car hours 154,919. The passengers amounted to 7,630,065. The population served is 135,000, and the average journeys per head averaged 57.

## MANUFACTURERS' PUBLICATIONS.

**The Maudslay Motor Company, Limited,** have issued a handsome catalogue on industrial and public service vehicles. The catalogue contains a description of a Maudslay engine with drawings and numerous photographic illustrations of various parts, the price list of the chassis and specifications of the respective types, and illustrations of numerous types of lorries, vans, chars-a-bancs and omnibuses. Users of commercial vehicles will find running costs which are given for machines of various capacities of much interest. A full list of spare parts concludes a publication of more than usual interest.

**Turners and Manville, Limited,** have issued a small pamphlet on "Sindanyo," a fireproof substitute for wood, slate, marble and fibre. This material is made principally from asbestos fibre, and has the physical characteristics of hard wood. It possesses great mechanical strength, and may be cut with an ordinary wood or hack saw, or drilled with a twist drill. It is manufactured in two grades, plain and ebony, and can be supplied in sheets, rods, tubes, or in moulded form. The plain grade is recommended for ordinary purposes, including tramcar linings. The material is thoroughly fireproof, and it is, therefore, useful for warehouse or factory doors, cabinets, etc.

**Robert Kearsley and Company, Limited,** of Ripon, have issued a handsome brochure (10¼in. by 8¼in.) consisting of illustrations of their works and offices. The object of the book is to give customers an insight into some of the daily work of a large varnish and paint factory, and to show the resources and organisation of the firm, which was founded in 1837, and has thus a history of seventy-five years. The illustrations show various parts of the works, which cover over five acres. One of the views gives the interior of the well-equipped electric power house, supplying power to the works, and another interesting illustration is that of the giant storage tanks, having a capacity of 60,000 gallons. Varnishes of all grades are made for use on railways, railway and tramway rolling stock, locomotives, motor cars, and for decorative work, etc. A large part of the factory is devoted to the manufacture of dry colours and the grinding of paints, ranging from the heavy oxides as used by engineers, to the finely ground colours for use on the best motor car work. The works include a well-equipped laboratory, paint shop, testing department, and show rooms, all of which are illustrated.

## COPPER AND ALUMINIUM MARKET.

July 11, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, July 11. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 62 15 0 .. | 63 10 0 .. | 73 12 6 |
| ,, ,, (three months) .. .. | 63 0 0 .. | 65 12 6 .. | 74 10 0 |
| Electrolytic Copper—bars or ingots .. | 67 0 0 .. | 68 5 0 .. | 78 10 0 |
| Aluminium—bars or ingots .. .. .. | 83 0 0 .. | 89 0 0 .. | 76 10 0 |

## COAL MARKET.

July 11, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, July 11. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 | 25 0 | | 22 9 |
| Best Seconds .. .. | 24 0 | 23 6 | | 21 4½ |
| Ordinary Drys .. .. | 21 0 | 20 6 | | 19 3 |
| Best Washed Nuts .. .. | 21 0 | 20 6 | | 18 9 |
| Best Washed Peas .. .. | 19 6 | 19 0 | | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 | 20 6 | 17 0 | 18 0 |
| Best Seconds .. .. | 19 6 | 19 0 | 17 0 | 17 4½ |
| Ordinary Drys .. .. | 16 6 | 16 0 | 15 3 | 15 3 |
| Best Washed Nuts .. .. | 16 6 | 16 0 | 14 0 | 14 9 |
| Best Washed Peas .. .. | 15 0 | 14 6 | 12 6 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 6 | 15 0 | 13 6 | 11 4½ |
| Best Seconds .. .. | 13 6 | 13 6 | 11 6 | 9 3 |
| Smalls .. .. .. | 10 0 | 8 9 | 9 9 | 5 9 |

Quotations owing to transport workers strike.

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | July 8 | £51,582 | £56,912 | 27 | £1,508,693 | +£126,019 |
| Auckland (28 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,903 |
| Ballarat and Bendigo | May 25 | 827 | 844 | 8 | 7,966 | — 1 |
| Bombay Rs. | June 13 | 3,008 | 3,056 | 24 | 74,974 | + 3,248 |
| Brazilian St. Rly. Mlrs. | May | 40,507 | 44,820 | 43 | 447,247 | + 9,595 |
| Brazilian Traction | June 28 | 80,853 | 88,987 | 26 | 2,350,511 | + 338,835 |
| Brisbane | June | 21,570 | 25,013 | 26 | 151,003 | + 43,349 |
| British Columbia $ | May | 491,826 | 566,128 | 47 | 6,269,128 | +1,017,780 |
| Buenos Aires Pt. & City | Feb. | 6,269 | 6,726 | 9 | 12,697 | — 1,100 |
| Buenos Aires Lacroze | June | 41,518 | 44,179 | 52 | 529,749 | + 43,906 |
| Calcutta Rs. | July 5 | 59,404 | 65,410 | 27 | 17,03,808 | + 75,449 |
| Cape Town | April | 11,771 | 12,175 | 17 | 51,462 | + 3,148 |
| Carthagena & Herrerias | June | 1,611 | 2,158 | 26 | 17,331 | + 6,498 |
| East India | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie | May | 8,270 | 3,059 | 21 | 14,372 | — 934 |
| La Plata | June | 3,557 | 4,846 | 26 | 31,571 | + 6,822 |
| Lima | April | 31,657 | 32,890 | 27 | 134,767 | + 6,133 |
| Lisbon Mlrs. | Jan. | ... | 147,848 | 4 | 147,848 | ... |
| Madras (14 days) Rs. | June 30 | 22,995 | 26,556 | 26 | 319,165 | + 22,207 |
| Melbourne | May | ... | 62,000 | 21½ | 324,000 | ... |
| Mexico $ | May | 559,832 | 595,795 | 21½ | 2,676,760 | — 36,306 |
| Montevideo | June | 26,392 | 28,820 | 34 | 258,427 | + 20,005 |
| Para | July 6 | 4,194 | 3,924 | 31 | 127,129 | + 3,357 |
| Perth (W.A.) | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth | April | 3,420 | 4,357 | 17 | 16,388 | + 1,312 |
| Shanghai $ | June 11 | 20,416 | 25,200 | 24 | 466,252 | + 85,720 |
| Singapore $ | July 5 | 10,396 | 11,509 | 27 | 314,005 | + 32,853 |
| Toronto $ | May | 693,015 | 811,872 | 21 | 3,840,280 | + 524,541 |
| Winnipeg $ | May | 298,713 | 3.6,827 | 21 | 1,651,336 | + 143,086 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London | July 5 | £4,440 | £4,777 | 27 | £138,020 | +£12,718 |
| City and South London | ,, 5 | 3.019 | 2,950 | 27 | 76,933 | — 7,721 |
| Liverpool Overhead | ,, 6 | 1,687 | 1,858 | 27 | 38,455 | + 2,540 |
| London Electric | ,, 5 | 13,440 | 13,685 | 27 | 382,965 | + 3 540 |
| Mersey | ,, 5 | 1.927 | 2,077 | 27 | 60.246 | + 3,794 |
| Metropolitan | ,, 6 | 17,987 | 18.023 | 27 | 452,726 | + 3,122 |
| Metropolitan District | ,, 5 | 13,017 | 13,520 | 27 | 356,176 | + 14,084 |


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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | July 2 | £1,590 | £1,710 | + £120 | 5 | £7,615 | + £355 |
| Ayr Corporation ..... | ,, 5 | 410 | 463 | + 53 | 7 | 2,660 | + 167 |
| Bath Electric ..... | ,, 2 | 1,001 | 1,236 | + 235 | 27 | 23,408 | + 574 |
| Birmingham Corp. ..... | ,, 5 | 10,860 | 11,884 | + 1,024 | 14 | 159,393 | + 11,537 |
| Blackburn Corporation | ,, 2 | 1,220 | 1,319 | + 99 | 14 | 18,186 | + 1,188 |
| Blackpool & Fleetwood | ,, 6 | 1,648 | 1,673 | + 25 | 26 | 18,766 | + 1,100 |
| Blackpool Corporation | June 19 | 1,160 | 1,435 | + 275 | 11½ | 14,643 | + 379 |
| Bolton Corporation ..... | July 6 | 2,595 | 2,666 | + 71 | 14 | 37,717 | + 1,420 |
| Bournemouth Corp..... | ,, 9 | 1,949 | 2,016 | + 67 | 14 | 28,542 | + 2,294 |
| Bradford Corporation... | ,, 5 | 5,577 | 6,282 | + 705 | 14 | 82,876 | + 3,899 |
| Brighton Corporation.. | ,, 6 | 1,113 | 1,139 | + 26 | 14 | 14,278 | — 23 |
| Bristol ..... | ,, 4 | 7,688 | 13,260 | + 5,572 | 26 | 193,553 | + 21,580 |
| British Elec. Traction— | | | | | | | |
| Airdrie ..... | July 4 | 312 | 406 | + 94 | 27 | 8,877 | + 1,250 |
| Barnsley ..... | ,, 4 | 193 | 369 | + 176 | 27 | 6,789 | + 2,332 |
| Barrow ..... | ,, 4 | 471 | 488 | + 17 | 27 | 10,181 | + 655 |
| Birmg. & Mid. Joint— | | | | | | | |
| Birmingham Dist. ... | July 4 | 943 | 994 | + 51 | 27 | 27,007 | + 1,864 |
| Dudley—Stourbridge | ,, 4 | 890 | 1,009 | + 119 | 27 | 24,426 | + 2,165 |
| South Staffordshire.. | ,, 4 | 926 | 944 | + 18 | 27 | 26,604 | + 2,196 |
| Wolverhampton Dist | ,, 4 | 483 | 517 | + 34 | 27 | 13,587 | + 1,079 |
| Devonport ..... | ,, 4 | 587 | 660 | + 73 | 27 | 14,146 | — 65 |
| Gateshead ..... | ,, 4 | 1,038 | 1,442 | + 404 | 27 | 31,648 | + 4,687 |
| Gravesend & N'thfleet | ,, 4 | 199 | 269 | + 70 | 27 | 5,961 | + 593 |
| Greenock—P.Gl'sgow | ,, 4 | 1,025 | 1,145 | + 120 | 27 | 22,165 | + 1,306 |
| Jarrow ..... | ,, 4 | 138 | 161 | + 23 | 27 | 3,754 | + 201 |
| Kidderminster ..... | ,, 4 | 129 | 194 | + 65 | 27 | 3,001 | + 118 |
| Merthyr ..... | ,, 4 | 211 | 239 | + 28 | 27 | 5,737 | + 660 |
| Metropolitan ..... | ,, 4 | 9,185 | 10,118 | + 933 | 27 | 238,837 | + 5,710 |
| Middleton ..... | ,, 4 | 338 | 395 | + 57 | 27 | 9,134 | + 528 |
| Oldham—Ashton..... | ,, 4 | 628 | 645 | + 17 | 27 | 16,254 | + 256 |
| Peterborough ..... | ,, 4 | 186 | 215 | + 29 | 27 | 4,159 | + 802 |
| Potteries ..... | ,, 4 | 2,206 | 2,264 | + 58 | 27 | 55,913 | + 7 263 |
| Rothesay ..... | ,, 4 | 506 | 505 | — 1 | 27 | 4,007 | + 396 |
| Sheerness ..... | ,, 4 | 57 | 58 | + 1 | 27 | 1,323 | + 86 |
| South Metropolitan.. | ,, 4 | 893 | 1,023 | + 130 | 27 | 21,780 | — 273 |
| Southport ..... | ,, 4 | 391 | 413 | + 22 | 27 | 7,880 | + 424 |
| Swansea ..... | ,, 4 | 1,228 | 1,497 | + 274 | 27 | 32,857 | + 3,316 |
| Taunton ..... | ,, 4 | 43 | 51 | + 3 | 27 | 1,238 | + 98 |
| Tynemouth..... | ,, 4 | 313 | 403 | + 90 | 27 | 6,073 | + 569 |
| Weston-super-Mare .. | ,, 4 | 234 | 327 | + 93 | 27 | 2,748 | + 483 |
| Worcester ..... | ,, 4 | 353 | 425 | + 72 | 27 | 7,724 | + 375 |
| Wrexham & District.. | ,, 4 | 135 | 144 | + 9 | 27 | 3,163 | + 296 |
| Yorks (Woollen) Dist. | ,, 4 | 1,102 | 1,210 | + 108 | 27 | 30,437 | + 2,309 |
| Burnley Corporation .. | ,, 5 | 1,470 | 1,659 | + 189 | 14 | 23,130 | + 2,384 |
| Burton-on-Trent Corp. | ,, 6 | 291 | 288 | — 3 | 14 | 3,952 | + 130 |
| Bury Corporation..... | ,, 6 | 1 420 | 1,423 | + 3 | 15 | 19,020 | + 253 |
| Cardiff Corporation..... | June 21 | 2,512 | 2,913 | + 401 | 12 | 31,337 | + 4,517 |
| Chatham and District.. | July 3 | 917 | 1,054 | + 137 | 26 | 23,134 | + 1,083 |
| Chesterfield Corp. ..... | ,, 3 | 250 | 274 | + 24 | 13 | 3,402 | + 475 |
| Colne & Trawden..... | ,, 5 | 274 | 306 | + 32 | 27 | 7,020 | + 336 |
| Cork Electric..... | ,, 3 | 545 | 613 | + 68 | 26 | 12,600 | — 130 |
| Croydon Corporation ... | June 28 | 1,953 | 1,742 | — 211 | 13 | 21,118 | — 3,268 |
| Darlington Corporation | July 5 | 233 | 250 | + 17 | 14 | 3 463 | + 845 |
| Derby Corporation ..... | ,, 5 | 917 | 1,010 | + 93 | 14 | 13,629 | + 1,864 |
| Dover Corporation ..... | ,, 5 | 266 | 255 | — 11 | 14 | 3,228 | — 114 |
| Dublin & Lucan ..... | ,, 4 | 94 | 76 | — 18 | 4 dys | 76 | — 18 |
| Dublin United ..... | ,, 4 | 6 662 | 7,710 | + 1,018 | 26½ | 155,831 | + 3,115 |
| Dundee City ..... | ,, 9 | 1,223 | 1,279 | + 56 | 8 | 10,543 | + 841 |
| East Ham Corporation | ,, 5 | 1,054 | 1,026 | — 28 | 14 | 14,788 | + 148 |
| Exeter Corporation ..... | ,, 4 | 344 | 407 | + 61 | 14 | 4,641 | + 57 |
| Glasgow Corporation .. | ,, 5 | 19,152 | 20,845 | + 1,693 | 5 | 104,747 | + 8,106 |
| Glossop (U. Elec. Supply) | ,, 5 | 131 | 133 | + 2 | 27 | 3,427 | + 470 |
| Halifax Corporation .. | ,, 1 | 2.069 | 3.320 | + 251 | 18 | 28.849 | — 212 |
| Hastings & District..... | ,, 3 | 1,054 | 1,177 | + 122 | 27 | 23.906 | + 1.273 |
| Huddersfield Corp. ..... | ,, 5 | 1,933 | 2,139 | + 206 | 14 | 29,712 | + 1,808 |
| Hull Corporation ..... | ,, 5 | 2,954 | 3,087 | + 133 | 14 | 42,380 | + 2,442 |
| Ilford U.D.C. ..... .. | ,, 5 | 553 | 492 | — 61 | 14 | 6,443 | — 1,081 |
| Ilkeston Corporation .. | ,, 9 | 129 | 136 | + 7 | 15 | 1,901 | + 441 |
| Ipswich Corporation .. | ,, 5 | 515 | 517 | + 2 | 14 | 6,185 | + 49 |
| Isle of Thanet ..... | ,, 5 | 1,017 | 1,129 | + 112 | 40 | 17,343 | + 450 |
| Kilmarnock Corp. ..... | ,, 5 | 158 | 175 | + 17 | 7 | 1,317 | + 87 |
| Lanarkshire ..... | ,, 3 | 1 667 | 1,844 | + 177 | 26 | 43,279 | + 5,986 |
| Lancashire United ..... | ,, 2 | 1,483 | 1,691 | + 198 | 26 | 38,311 | + 3,850 |
| Leeds City ..... | ,, 5 | 8,082 | 8,783 | + 721 | 14 | 115,614 | + 8,127 |
| Leicester Corporation.. | ,, 5 | 2,758 | 2,942 | + 184 | 27 | 74,158 | + 7,537 |
| Leith Corporation ..... | ,, 5 | 769 | 819 | + 50 | 7 | 5,501 | + 351 |
| Liverpool Corporation.. | ,, 5 | 12,856 | 13,750 | + 894 | 26½ | 333,414 | + 19,562 |
| Llandudno & Colwyn B. | ,, 4 | 489 | 500 | + 11 | 31 | 7,361 | + 737 |
| London County Council | ,, 2 | 43,479 | 43,445 | — 34 | 13 | 563,237 | — 20,293 |
| London Gnl. Omnibus.. | ,, 5 | 54,624 | 71,548 | +12,924 | 27 | 1,617,314 | + 375,680 |
| London United ..... | ,, 4 | 6 730 | 7,716 | + 986 | 27 | 162.152 | — 1,313 |
| Lowestoft Corporation | ,, 5 | 210 | 219 | + 9 | 39 | 6,606 | + 353 |
| Maidstone Corporation | ,, 3 | 209 | 233 | + 24 | 14 | 2,771 | + 182 |
| Manchester Corp..... | ,, 5 | 17.455 | 18,239 | + 784 | 14 | 244,439 | + 11,344 |
| Nelson Corporation..... | June 23 | 193 | 232 | + 39 | 13 | 2,691 | + 43 |
| N'castle-on-Tyne Corp. | July 5 | 4 283 | 4,616 | + 333 | 14 | 67,395 | + 5,420 |
| Newport (Mon.) Corp... | June 28 | 729 | 769 | + 40 | 13 | 9,479 | + 594 |
| New St. Helens & Dist... | July 2 | 823 | 887 | + 64 | 2 dys | 214 | + 18 |
| Northampton Corp ..... | ,, 4 | 567 | 630 | + 63 | 13½ | 7,887 | + 247 |
| Nottingham Corp. ..... | ,, 8 | 3,236 | 3,349 | + 113 | 13½ | 45,028 | + 1,466 |
| Oldham Corporation ... | ,, 6 | 2,164 | 2,234 | + 70 | 15 | 32,069 | + 1,210 |
| Portsmouth Corp..... | ,, 5 | 2,573 | 2,790 | + 217 | 14 | 30,130 | — 223 |
| Preston Corporation ... | ,, 2 | 844 | 839 | — 5 | 14 | 12,197 | + 848 |
| Provincial ..... | ,, 5 | 2,043 | 2,418 | + 375 | 39½ | 69,112 | + 3,425 |
| Reading Corporation .. | ,, 3 | 656 | 731 | + 75 | 13 | 9 137 | + 467 |
| Rochdale Corporation | ,, 5 | 1,598 | 1,673 | + 75 | 14 | 22,022 | + 319 |
| Rotherham Corp..... | ,, 9 | 815 | 965 | + 150 | 14 | 13,741 | + 3,582 |
| Salford Corporation .. | ,, 7 | 5,434 | 5,350 | — 84 | 14 | 73,304 | + 1,103 |
| Sheffield Corporation... | ,, 8 | 6,867 | 7,542 | + 676 | 15 | 103,571 | + 11,465 |
| Southampton Corp..... | ,, 2 | 1,363 | 1,412 | + 49 | 13 | 17,094 | + 393 |
| Southend-on-Sea Corp | ,, 2 | 886 | 1,089 | + 203 | 14 | 11,261 | + 1,071 |
| South Shields Corp..... | ,, 5 | 662 | 744 | + 82 | 14 | 9,774 | + 1,235 |
| Sunderland Corp..... | ,, 6 | 1,382 | 1,532 | + 150 | 14 | 19,616 | + 1,982 |
| Sunderland District ... | ,, 2 | 490 | 591 | + 103 | 35 | 18,633 | + 3,515 |
| Swindon Corporation'... | ,, 2 | 157 | 174 | + 17 | 13 | 2,174 | + 189 |
| Trys. (M.E.T.) Omn. Co. | ,, 5 | ... | 5,826 | ... | 27 | 64,893 | ... |
| Tyneside Trys. & Tmrds. | June 30 | 600 | 815 | + 215 | 27 | 14,488 | + 976 |
| Wallasey Corporation | July 5 | 1,227 | 1,341 | + 114 | 14 | 16,705 | + 1,036 |
| Walsall Corporation ... | ,, 5 | 593 | 625 | + 32 | 27 | 16,406 | + 1,220 |
| Walthamstow U. D.C. | June 28 | 797 | 746 | — 51 | 13 | 9,713 | — 517 |
| Warrington Corp..... | July 3 | 468 | 482 | + 14 | 14 | 6,067 | + 290 |
| West Ham Corporation | ,, 3 | 2,611 | 2,885 | + 274 | 14 | 37,369 | + 777 |
| Wigan Corporation..... | ,, 3 | 1,333 | 1,432 | + 99 | 13 | 19,743 | + 2,135 |
| Wolverhampton Corp | ,, 9 | 1,159 | 1,162 | + 3 | 15 | 15 508 | + 725 |
| Yorkshire (W. Riding | ,, 6 | 1 344 | 1 432 | + 88 | 27 | 39,093 | + 4,298 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, July 11. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 79 — 82 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¼ — 5 |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | — 1/16 | 4¼ — 4½ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 90½ — 92½ |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 94½ — 96½ |
| 100 | Do. 5% Deb. Stk. Red.... | ... | 95½ — 97½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 99 —101 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum. Pref ..... | ... | 25/32 — 27/32 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red..... | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13¾ — 14¼ |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref ... | + 1/16 | 11 — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | — ⅛ | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | | 85 — 87 |
| 5 | Brisbane Elec. Trams. Investment (Co., Ltd., Ord. ..... | ... | 6⅜ — 7⅜ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. ... | ... | 97 —100 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6¾ xd |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 7 — 7¾ ,, |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 ,, |
| 100 | Do. do. 4½% Deb. Stock ..... | + 1 | 94 — 96 ,, |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | ... | 121 —126 |
| 100 | Do. Pref. Ord. Stock ..... | + 2 | 109 —114 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | — ½ | 100½ —103½ xd |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | ... | 95 — 97 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 78 — 81 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 38 — 41 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 8 — 10 |
| 100 | Do, Deferred Ord. Stock ..... | ... | 3½ — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock..... | + ½ | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 73 — 77 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 92 — 96 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 6% 1st Mrt. Deb. | ... | 98½ —100½ |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ — 6¼ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4 1/16 — 5 1/16 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., ..... | ... | 11/16 — 13/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3¾ — 4 |
| 190 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5¾ — 6⅛ |
| 100 | Do. 4% Debenture Stock Red, 1985 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 92½ — 94½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | 8⅞ — 9⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | — 1/16 | — 11½ |
| 10 | Do. do. 6% Pref. ..... | + ⅛ | — 12¾ |
| 100 | Do. do. "A" Red. ..... | ... | — 81 |
| 100 | Do. do. Deb. Stock "B" Red. ... | — ¼ | — 79½ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8¾ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | 3/32 — 5/32 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | — 2½ | 94½ — 98½ xd |
| 100 | Hong Kong, Tramways Co., 8% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 4 — 4½ xd |
| 10 | Do. do. 6% Cum. Pref..... | ... | 7 — 7½ ,, |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 ,, |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2½ — 2⅝ |
| 100 | Do. do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 3/32 — 5/32 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | 1 1/32 — 1 3/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 10 — 10½ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 1 3/32 — 1 5/32 |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | 1/2 — 13/16 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | + ⅛ | 93½ — 94½ |
| 100 | Do. Do. 5% Cum, Inc. Deb. Stk. Red | — 1 | 87 — 89 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | — 2 | 57 — 61 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do, do. 6% Cum. Pref..... | ... | 4¼ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87½ — 90½ |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | — ½ | 108½ —111½ |
| $1,000 | Do. do. 5% Bds. ..... | ... | 98½ —100½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1/16 — 1/8 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ... | ... | 84 — 88 |
| 100 | Do. do. 5% Deb. Stock, Red ... | ... | 91½ — 94½ |
| $100 | Mexico Tramways Co., Common Stock ..... | — 6 | 87 — 90 xd |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 89 — 92 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — 1 | 90 — 93 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. ..... | ... | 1⅛ — 1¼ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6¾ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 6½ — 6¾ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | — ⅛ | 6¼ — 6¾ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5 |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord..... | ... | 1⅛ — 1⅜ |
| 100 | Do. do. 5% 1st Mt. Deb. Stk. Rd. | ... | 102½ —105½ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 9/32 — 11/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | 7/8 — 1 1/8 |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim.. Ord. ..... | ... | 31/32 — 1 1/32 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5 %... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5¼ — 5¾ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | — ¼ | 98 — 98 |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | ... | 91 — 93 |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | — — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | ... | 99 —101 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8¼ — 9¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | + 1½ | 85 — 89 |
| 1 | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅝ — ¾ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 63 — 68 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 96 — 98 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 99 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | — 1 | 86 — 88 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83½ — 92½ |
| 5 | United Elec. Tramways of Monte Video, Ord..... | ... | 4⅜ — 4⅞ |
| 5 | Do. do. 6% Cum. Pref..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 — 99 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ —101½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅝ — ¾ |
| 5 | Do. do 6% Cum Pref ..... | ... | 3/4 — 15/16 |
| 100 | Do. do 4½% 1st Deb. Stock. Red.... .. | + 1 | 81 — 86 |

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THE

# Tramway & Railway World

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### CITY OF NORWICH.

The Electricity Committee invite tenders for the supply of

1. One 3,000 kw. Turbo-Alternator and Surface Condensing Plant.
2. Rotary Converters.
3. E.H.T. Switchgear.

Specifications, forms of tender, and conditions of contract may be obtained from Mr. F. H. Long, City Electrical Engineer, Corporation Electricity Works, Norwich.

Sealed tenders, addressed to the Chairman of the Electricity Committee at the Electricity Works, and endorsed "Tender for ....," to be delivered not later than 11 a.m. Tuesday, August 12.

The Committee do not bind themselves to accept the lowest or any tender.

A. H. MILLER,
Town Clerk.

Guildhall, Norwich,
July 16, 1913.

### COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for E.H.T. Feeder Panel.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Five shillings each will be charged for extra copies of specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for E.H.T. Feeder Panel," and delivered not later than 12 o'clock noon on Wednesday, August 6.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

### COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for twelve months' supply of Earthenware Conduit.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Five shillings each will be charged for extra copies of specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Earthenware Conduit," and delivered not later than 12 o'clock noon on Wednesday, August 6, 1913.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

### CORPORATION OF BLOEMFONTEIN, O.F.S., SOUTH AFRICA.

RAILLESS ELECTRIC TRAMWAYS.

Tenders are hereby invited for the supply and equipment of a system of Electric Railless Tramways within the City of Bloemfontein, Orange Free State, South Africa, including:—

Section A.—Supply of Poles, Brackets, etc.
Section B.—Erection of Poles, supply and erection of all Overhead Lines, Section and Feeder Pillars, Feeder Cables, etc.
Section C.—Supply and erection of Two 250 kw. Converting Machines, 2,100 V.A.C. 50 Cycles to 550 V.D.C., with all adjuncts, etc.
Section D.—Supply and erection of complete Switchboard.
Section E.—Supply and delivery of Ten Railless Electric Cars.

Tenders for the whole of the work, or for any one section, or portion of a section, must be delivered to the Agents of the Town Council, Messrs. Davis and Soper, 54, St. Mary Axe, London, E.C., not later than 12 noon on the 15th August, 1913.

The Council does not bind itself to accept the lowest tender, or any tender, but reserves to itself the right to accept the whole of any tender or any section or portion of a tender.

Plans and specifications, together with conditions of contract, may be obtained on payment of £5 stg. (which will be refunded on receipt of a *bonâ-fide* tender) at the office of the Agents, Messrs. Davis and Soper, 54, St. Mary Axe, London, E.C., on and after the 16th July, 1913, or at the office of the City Engineer, Town Hall, Bloemfontein, on and after the 28th June, 1913.

By order, W. A. KOLLER,
Town Clerk.

### BOURNEMOUTH CORPORATION TRAMWAYS.

The Tramways Committee of the County Borough of Bournemouth are prepared to receive tenders not later than August 27, 1913, for:—

Reconstruction of Permanent Way (equal to about 3 miles single track).

Specifications, quantities, and forms of tender may be obtained on application to the undersigned on payment of a deposit of £2, which will not be returned except on receipt of a *bonâ-fide* tender.

Additional copies may be had on payment of £1 1s. each, which will not be returned.

The Committee do not bind themselves to accept the lowest or any tender.

I. BULFIN, B.A., A.M.I.C.E., M.I.M.E., M.I.E.E.,
General Manager.

Tramways Offices, Bournemouth.

### CORPORATION OF MIDDLETON.

SWITCHBOARDS.

The Corporation are prepared to receive tenders for the supply of Lighting Switchboard and renewals to Traction Switchboard.

Copies of specification, etc., can be obtained from Mr. S. Pauls, Electrical Engineer, Townley Street, Middleton. Sealed tenders, addressed to the Chairman of the Electricity Committee, endorsed "Switchboard," to be delivered to the undersigned on or before mid day Monday, the 28th day of July, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

F. ENTWISTLE,
Town Clerk.

Town Hall, Middleton.

## WANTED.

### DOUBLE-DECK CAR.

Wanted—Small Double-Deck Car, 4ft. 8½in. gauge, G.E. 58 Motors, B. 18 Controllers. Must be in good condition. Full particulars to Manager, Electricity Works, Glossop.

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## POSITIONS VACANT.

### COVENTRY CORPORATION TRAMWAYS.

CHIEF CLERK AND ACCOUNTANT.

Applications are invited for the position of Chief Clerk and Accountant to take charge of the accounts and clerical staff. Salary £180 per annum, increasing to £200 after 12 months' satisfactory service.

Applications should state experience, qualifications and be accompanied by copies of not more than three testimonials, and endorsed "Chief Clerk," and must be sent in not later than Thursday, July 31, 1913, addressed to the undersigned.

T. R. WHITEHEAD,
General Manager.

Priestley's Bridge Depôt, Coventry,
July 18, 1913.

### ERITH URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

CHARGE ENGINEER.

Applications are invited from qualified persons for above position. Applicants must possess high-tension three-phase experience and be conversant with details of a modern A.C. station. Salary 40s. per week, rising (upon satisfactory service) by annual increments of 2s. 6d. per week to a maximum of 50s.

Applications, stating age, experience, and present and past positions, with copies of testimonials, to be addressed to the Engineer and Manager, Electricity Offices, Walnut Tree Road, Erith, S.E.

### "LIVE" MAN.

Required, Smart Man, capable of dealing with work necessitating a thorough knowledge of theory and practice of number. Must not be bound down to mathematical text-book methods, but should possess advanced calculative ability, and be able to apply same in practice. A real "live" man, with some organising capacity, and one who can carry through to a completion, mathematical schemes and schedules. Salary and particulars on application, by letter, to Box 4019, Willing's, 125, Strand, W.C.

## FOR SALE.

### BRAKES.

The Proprietor of British Letters Patent, No. 16319 of 1906, is prepared to Sell the Patent or to License British Manufacturers to Work thereunder. It relates to improved adjusting arrangements for compressed air, electric or hand brakes of tramways and like cars.

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THE
# Tramway AND Railway World

**Established in 1892 and Published by**

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SATURDAY, JULY 19, 1913.

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## TRAMWAY EMPLOYEES' CONDITIONS.

It would be a matter for surprise if the industrial unrest witnessed during the past few months left tramway employees unaffected. Those in the Black Country were wise enough to accept the concessions offered by the British Electric Traction Company. The Lanarkshire Tramway Company have issued a notice intimating that they are prepared to meet their men as far as possible on the question of holidays and hours by granting six days' holidays with pay to motormen and conductors who have been in the service for six months, and reducing the longest turns and the spread-over as far as is reasonably possible. An offer to arbitrate on the claims of the Stalybridge Joint Tramways Board's employees has been rejected by the latter in favour of a ballot on the question of a strike. Bradford Tramways Committee effected a speedy settlement of the requests made to them, and two or three of the smaller municipal undertakings have given terms which represent the limit which their finances will bear, such as an increase of a farthing an hour and the extension to spare hands of the week's holiday with pay. The Manchester men have for some time had under consideration proposals for the improvement of their conditions of service, which cannot be excelled anyhwere in the kingdom. A position of some difficulty has been created for the Manchester Tramways Committee by the recommendation of the Workmen's Committee of the Corporation that all men employed in the engineering and allied trades be engaged at the standard rate of wages recognised by the associations of employers and the local organised bodies of workers in such trades in the district. The Corporation adopted this proposal, although the Tramways Committee had asked for its excision owing to the difficulty of securing the right kind of skilled men. As an example of ingratitude it would be difficult to surpass the attitude of the Sheffield union men. Their application was for time and a half to all employees for Sunday work, and the Tramways Committee decided that it should be granted at a cost of £1,254 per annum to motormen and conductors with over five years' service, and that the shilling per week merit pay at present given to car cleaners of ten years' approved service should be extended at a cost of £85 per annum to night shed men, brake-fitters, trolley examiners, overhaul fitters, etc., of ten years' approved service. In return the unionists have asked for an immediate response to the terms of their application, and they threaten to take steps to at once enforce the demand. Yet at a meeting of the Sheffield Federated Trades Council, the tramway union secretary admitted that the men had always been received courteously, that they had never come away empty handed, and that during the last nine years the union had gained nearly £15,000 for the employees. These observations were advanced in support of a resolution passed by the Trades Council embodying an impudent demand for the elimination of non-unionists from all Corporation departments, and for officials to give preference to trades unionists when engaging workmen. We may safely assume that the men will not be in a hurry to incur public disfavour by striking because they have been offered an increase of £1,254 in wages. Thanks to the spirited action of the directors of the Edinburgh Company, the tramwaymen of that city are not likely to find much support if they persist in their threat (made without the sanction of their union) to cease work this week unless the company concede a rise of a halfpenny to all employees. The men work 54 hours per week, and the directors first offered an increase of a farthing an hour to drivers and conductors. Immediately the directors received the strike threat on Tuesday last the manager issued two forms to each man, either of which had to be filled up and returned before midnight, the cars being stopped at 10 P.M. to enable the men to send in the forms. One embodied acceptance of the directors' terms and a declaration against striking, the other being a refusal and a statement of intention to strike. If more than half sign in favour of a strike the whole of the car hands and the engineers and general staff will be paid off this (Saturday) evening, and the works will not be reopened until a sufficient number of men have been trained to maintain the services. An intimation has also been given that under no circumstances will any strikers be reinstated. As the men's pickets outside of the office reported that only thirteen men had returned forms, a struggle seems inevitable. As the result of a further conference with a deputation in order to consider points which had been left in abeyance until the arrival of the chairman of the company in Edinburgh, the directors on Thursday announced as their final decision that they had agreed to ¼d. per hour also being given to the ten years' proved service conductors, and that the pointsmen would be placed on the same basis as the conductors and drivers by being paid time and a half for Sunday work.

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**Railless Traction Bills.**—The Committee of the House of Lords, of which Lord Ribblesdale is chairman, on July 14 reported for third reading the Bill which had already passed the House of Commons authorising the installation of a system of railless trolley cars in Wood Green, Tottenham, and Walthamstow.—On July 14 Lord Newton's Committee of the House of Lords allowed the Mexborough and Swinton Railless Traction Bill to proceed, on condition that the canal bridge shall be subject to the same protection as the various local authorities, as given in the case of the Doncaster Rural Council.

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## STREET TRAFFIC IN GLASGOW AND LEEDS.

The Select Committee of the House of Commons inquiring into the cause of accidents from motor traffic in London this week went further afield in their investigation and heard evidence on Wednesday from Mr. L. Mackinnon, traffic superintendent of Glasgow Corporation tramways, and on Thursday from Sir Robert Fox, town clerk of Leeds.

Mr. Mackinnon said that the traffic problem was a very pressing one in Glasgow. The cause of the congestion was the bringing in of all the cars to the centre of the city. The river divided the city into two sections—north and south—but west of Jamaica Bridge there was no bridge for taking the traffic across. As showing the developments of the tramway system—in 1894, when the Corporation started the tramways, they had 240 cars. At the present time they had 853, of which on busy days about 800 were in regular service. With regard to provision against accidents, each car was fitted with life-guard both in front and at the sides. That system was found perfectly satisfactory. In 1911 193 persons were lifted by the guard. On six occasions the life-guard failed to lift the body, and in four of these cases the body was pushed to the side. In 1912 the life-guard was in operation 171 times. In three cases it failed to lift the body, which, however, was pushed aside in each case. In 1913 the guard was in action 172 times. It failed on three occasions, and each time the body got under the car. These figures related to the front guard. He had no particulars relating to the working of the side guard. In 1911 out of 237,000,000 passengers carried over a mileage of 21,704,000 there were only 10 fatal accidents; in 1912, out of 275,000,000 passengers on a mileage of 22,435,000, only seven; and in 1913, out of 311,480,000 passengers on a mileage of 23,335,000, only 14. At present 4,650 cars crossed Jamaica Bridge daily, which made that bridge a very great centre of congestion. With a view to relieving that congestion it had been decided to build a new bridge west of Jamaica Street near Oswald Street. The Tramways Committee had also decided to reconstruct the Suspension Bridge and make it suitable for vehicular traffic. The Tramways Department would pay the cost of both bridges. Discussing the general treatment of congestion, Mr. Mackinnon said that at 47 points the traffic was regulated by the police and at eight of these places two constables were on duty at the same time. There were also 40 timekeepers of the tramways department, who regulated the traffic at the principal junctions. The ticket and traffic inspectors, numbering 50, also devoted attention to these matters. The central streets in the city were very narrow, the width varying from 27ft. to 46ft. or 50ft. The average width of the streets on which the tramways ran was under 40ft. Each car was fitted with three brakes. In a series of recent tests he had found that a car travelling at 12 miles an hour could be pulled up in its own length—30ft. At 14 miles an hour it could be pulled up in 45ft., and at 16 miles in 50ft. These results were obtained by using the ordinary service brake. With the emergency brake the cars could be brought to a standstill in a much shorter distance. The congestion of street traffic did not lead to loss of life, but it led to loss of time.

In regard to motor omnibuses, he thought their absence from Glasgow tended to safety. He did not think omnibuses could live in Glasgow in competition with the tramways at the low fares. He did not think Glasgow had a large number of accidents in comparison with other cities, but one reason why there were so many was that there were no open spaces in the centre of the city in which children could play. The city thoroughfares were the only playgrounds they had. Analysing the list of fatal accidents, he found that in 1911 60 per cent. represented children, in 1912 57 per cent., and in 1913 50 per cent.

As to tramway extension, application was about to be made for powers to construct 15 miles of tramways. It had never been suggested that the Corporation should run motor omnibuses in the city except as an experiment in the way of an all-night service, but that had never been done. He regarded a tramcar running on fixed rails as the safest vehicle they could have on the streets.

Sir Robert Fox in his evidence stated that Leeds Corporation besides owning and working the tramways also ran omnibuses in connection outside the city area. There had been no fatal accidents caused by omnibuses. The maximum number of fatal accidents caused by tramcars in the last ten years was six, and from other mechanically-propelled vehicles, such as motor cars and cycles, the maximum number of fatal accidents was 10 in 1911. During the last three or four years there had been a progressive increase in the number of non-fatal accidents from tramcars as new routes had been opened and more cars had been put on. The number of non-fatal accidents from other mechanically-propelled vehicles had increased threefold in the last four years, and had risen from 33 in 1907 to 108 in 1910, 142 in 1911, and 184 in 1912. As a precautionary measure a larger number of police had been put on point duty, but they had come to the conclusion that their powers were not sufficient, especially in dealing with intermittent traffic. The drivers of motor cars were bound by law to stop when called on by the police to do so, and he failed to see why other traffic should not be subject to a similar law. What was required was a statutory provision of general application.

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**Proposed Revision of Stopping Places.**—On the recommendation of the manager, the Brighton Tramways Committee advised the Council to apply to the Board of Trade to change several compulsory stops to optional stops, several being on descending journeys. The Council, however, referred the report back for further consideration.

## CROYDON AND OMNIBUS COMPETITION.

PROBABILITY OF RATE-AID NEXT YEAR—REQUEST FOR LEGISLATION.

Mr. T. B. Goodyer, manager of the Croydon Corporation tramways, has forwarded to over 70 members of Parliament representing constituencies in and adjacent to the Metropolitan area, and also to the members of the Parliamentary Labour Party, copies of the resolution unanimously passed by the Croydon Corporation, urging the Government to pass such legislation as will place motor omnibus companies on terms of equality with regard to public obligations with the Municipal Tramways Authorities. The letter also states:—

"The Municipal Tramways Authorities in the area named have expended, practically, 13½ millions of pounds on their undertakings, and when I tell you that, next year, there is every probability that each undertaking will require aid from the rates—instead of being self-supporting, as hitherto—you will, I trust, readily see how very serious the present outlook is for those ratepayers in the Metropolitan area whose tramways are municipally owned. The Metropolitan tramways managers desire, not that their undertakings shall have any preferential treatment, but that motor omnibus operators should be placed on terms of equality with regard to the public burdens now borne by the tramways in the area named. May I express the hope that it will be possible—in the interests of the ratepayers concerned—for you, and the party you represent, to co-operate with other Parliamentary representatives in urging the Government to pass such legislation as will prevent the already over-taxed ratepayer from being further burdened."

Enclosed with the letter was the following extract from Mr. Goodyer's report on the Croydon tramways for the year ended March 31, 1913:—

COMPARISON OF PUBLIC BURDENS BORNE BY TRAMCARS AND MOTOR OMNIBUSES IN CROYDON.

| Items. | Car. £ s. d. | Omnibus. £ s. d. |
|---|---|---|
| License Duties .. .. .. .. | 2 15 0 .. | 5 18 0 |
| Rates on Track .. .. .. | 43 8 9 .. | — |
| Maintenance of Road .. .. .. | 92 11 9 .. | — |
| Petrol Tax .. .. .. .. | — .. | 43 0 0 |
| Total .. .. .. | £138 15 6 .. | £48 18 0 |

In addition to the above payments, the Croydon cars for the past year have contributed £3,000 towards the rates, or an average per car of £51 14s. 6d., thus making the sum of £100 10s. per car run, or a gross total of £11,005 16s. 7d. as a contribution to the local revenue, while the contribution of the 'buses is *nil*.

ADDITIONAL NOTES RELATING TO LOCAL EXPENDITURE BY CROYDON CARS FOR YEAR ENDED MARCH 31, 1913.

The amount paid in wages was £32,264,* or 35.63 per cent. of the revenue earned (£90,543).

Out of every 20s. earned 7s. 1½d. has been spent in wages.

No doubt the greater part of this sum would be expended locally in house rent, tradespeople, etc.

The permanent way expenses and the rates and taxes represent respectively 5.93 per cent. and 2.61 per cent. of the revenue earned.

HOW TRAMCARS IN THE METROPOLITAN AREA ARE HANDICAPPED IN COMPARISON WITH THE OMNIBUSES.

| | Tramcars. | Omnibuses. |
|---|---|---|
| Control | Only permitted to run on routes sanctioned by Parliament. | Free to go anywhere at their option. |
| Track. | Provided and maintained by the system. Damage done by motor 'buses and other traffic repaired at cost of trams. | Provided and maintained by the rates. Repairs paid for by the general ratepayer. |
| Workpeople's Fares. | On all routes. | None. |
| Rates on Track. | Pays rates on track. | None. |

It will be observed from the foregoing that omnibuses operate under conditions of unmatched freedom from every point of view. A tramway, which is a statutory undertaking, constructed under conditions necessitating a heavy capital expenditure—afterwards, burdened by yearly charges, and having to comply with the Board of Trade conditions—is heavily handicapped in having to compete with another system, contributing largely towards the wear and tear of the various roads in the borough over which it runs, but making no payment *whatever* towards the maintenance of such roads, or local burdens. Tramways, also, are under statutory obligations to provide exceptionally cheap fares for their workpeople's services, thereby benefiting employers as well as employees. The provision of such facilities, in all cases, may be said to result in a serious loss. The motor omnibus has no obligation to give similar facilities—yet which are requisite—has no legal liabilities in connection with road maintenance, and is subject to no rates other than those for buildings and garages which are occupied. Those who use the roads for the benefit of shareholders should pay for the upkeep of those roads. Tramways pay more than their fair share of the cost of road maintenance by reason of the obligation that rests upon them to make good and

*Including the wages paid to permanent way men in roads department.

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maintain the permanent way, which they only technically "use," and the width of the paving each side of the track. In addition, they are also called upon to pay the equivalent of a rent for the use of the roads in the shape of a substantial contribution for rating.

Legislation, therefore, in the interests of the ratepayers and those Municipal Authorities in the Metropolitan area who have invested 13½ millions of pounds in their tramway undertakings—is very urgently required, so that services provided by the community, at the cost of the community and in the interests of the community, should not be in a *less* favourable position than other competitive means of transport. Fortunately, valuable precedents in respect of contributions towards road maintenance by the operation of motor omnibuses and trackless trolley vehicles, have already been established in the following instances. Mr. Goodyer here cites the Chesterfield Corporation's Motor Omnibus and Trackless Trolley Bill and the Rhondda Tramways Company's Trackless Trolley Bill dealt with in May last. In the first case a House of Commons Committee required a clause to be inserted in the Bill in order to render the Corporation "liable for damage arising out of the extraordinary traffic proposed by the Bill, such damage to be assessed, at the end of three years, by arbitration." In the Rhondda Bill a clause was inserted requiring the promoters "to pay a fixed sum per car mile towards the maintenance of the roads upon which such vehicles shall be run."

The question of principle having at last been determined, as in the cases mentioned, the matter should, obviously, Mr. Goodyer states, be carried a step further and applied to the Metropolitan area where the local authorities have no control over the licensing of public vehicles.

## L.C.C. TRAMWAY MATTERS.

IMPROVEMENT IN RECEIPTS.

The usual statement of the tramway traffic receipts presented by the Highways Committee at last Tuesday's meeting of the London County Council showed a welcome change as compared with the decreases exhibited owing to motor omnibus competition for some time past. The total traffic receipts for the week ended July 2 were £43,445, as compared with £43,479 for the week ended July 3, 1912. The decrease was thus only nominal. The number of passengers carried showed a marked increase, the total being 10,263,626 as compared with 10,253,039 in the corresponding week. The length of route open was 143.04 miles against 140.57 miles. Out of the total 6.91 miles were worked by horse against 10.31 miles in the previous year. The electric lines alone showed an appreciable increase both in traffic receipts and in passengers. The total decrease in traffic receipts from April 1 to July 2 of the present year was £20,203.

CARS FOR SPECIAL PURPOSES.

The Highways Committee reported that the Board of Trade had now made the amended by-laws requested by the Council relating to the use of tramcars for special purposes.

COST OF PROMOTION OF BILLS.

A statement was submitted, as given below, showing the cost of promoting London County Council (Tramways and Improvements) Bills during the session of Parliament from 1904 to 1912 together with the length of the lines proposed and the mileage authorised by Parliament.

| Session. | Cost of promotion. £ | Mileage in Bill as deposited. | Mileage authorised. |
|---|---|---|---|
| 1904 ... ... ... | 5,118 | 25⅝ | 11½ |
| 1905 ... ... ... | 2,123 | 2½ | Rejected |
| 1906 ... ... ... | 5,463 | 16½ | 6¾ |
| 1907 ... ... ... | 2,702 | 5½ | ⅝ |
| 1908 ... ... ... | 1,532 | 4¼ | 2¾ |
| 1909 ... ... ... | 4,301 | 10¼ | 3⅝ |
| 1910 ... ... ... | 4,116 | 15 | 2¾ |
| 1911 ... ... ... | 3,686 | 14¾ | 1⅝ |
| 1912 ... ... ... | 3,253 | 5⅝ | 1⅛ |

The mileage given is for new tramways only, and does not include schemes for the reconstruction of existing lines for electric traction. The Bills also include many miscellaneous proposals relating to the tramway undertaking.

A TRAMWAY "LAY-BY."

The Highways Committee had conferred further with the representatives of the Camberwell Borough Council on the question of constructing a tramway "lay-by" in the Harders Road, Peckham, in order to relieve the congestion of traffic near Rye Lane. As a result it had been agreed that the "lay-by" should be installed. No property would have to be acquired, and the cost of installing the "lay-by" was estimated at £2,250.

All tramway reports were adopted.

In the course of a discussion on the cost of promoting tramway Bills from 1904 to 1912,

Sir JOHN BENN said that from 1904 to 1906 18 miles were added to the system at a cost of £706 per mile for Parliamentary expenses, whereas from 1907 to 1912 13 miles had been added at a cost of £1,500 a mile.

Mr. CYRIL JACKSON pointed out that in the latter period the most difficult routes had to be dealt with, and the Government had not attempted to remove the local veto. This year there would be a reduction of expenses as the Council were not promoting hopeless extensions.

## PRIVATE BILL LEGISLATION.

A QUESTION OF COMPULSORY RUNNING POWERS.—In the House of Commons on Monday the decision of a Select Committee on the London County Council Tramways Bill was reviewed. One of the proposals in the Bill was that the Council should be empowered to work when they acquire it from the London United Tramways Company a short cross-connecting length of tramway in the western suburbs. The Council already have power to work the parts of the main lines of the company which are in London as soon as the purchase has been completed. The Committee on the Bill granted the power to work the cross-line, but against the wish of the promoters inserted clauses giving the company compulsory running powers over the main lines in London which terminate at Hammersmith and Shepherd's Bush, their idea being to make certain that there should be through communication between the purchased lines in London and the western part of the lines outside which remain in the hands of the company. The Council took up the position that they would doubtless make voluntary arrangements for mutual through running as they have already done with other outside lines, but they objected on principle to the company being given compulsory running powers. SIR E. Cornwall (N.E. Bethnal Green—L.) now moved the deletion of the clauses giving these powers, and after some discussion the proposal to delete the clause was agreed to and the Bill was read a third time.

## NEW AND PROSPECTIVE WORK.

BELFAST.—The Corporation have decided to apply to the Local Government Board for sanction to a loan of £35,000 for the extension of the electricity undertaking.

CARDIFF.—On the recommendation of Mr. A. Ellis, the electrical engineer and tramways manager, the Finance Committee have advised the Corporation to borrow £30,000 for the purpose of purchasing new plant and machinery at the power station.

WEST HARTLEPOOL.—A plan for an extension to the tramway car shed has been adopted, and the manager has drawn up a memorandum for the approval of Mr. J. F. C. Snell, the consulting engineer, of suggested alterations and renewal of plant. On July 2 the Council approved of the suggested alterations to the car shed, the purchase of four new cars, and a rail-grinding equipment. On the preceding day a Local Government Board inquiry was held into an application to borrow £4,300 for the purchase of new plant for the electricity works in connection with the supply of current to the tramways.

## MISCELLANEOUS NEWS AND NOTES.

**The Tramways and Light Railways Association.**—The "Official Journal" for July contains a report of the discussions at the Congress at Blackpool, and the list of applications for light railway orders.

**Conveyance of Postmen.**—Contracts have been made with the Postmaster-General for the conveyance of postmen on the tramcars in Coventry and Southampton. In the former city the payment is £200 per annum, and the contract is for five years.

**Traffic Inducement at Lowestoft.**—The Town Council have confirmed the action of the Parks Committee in granting an application by the tramways manager for permission to place a band at Belle Vue Park and Kirkley Recreation Ground on alternate Sunday afternoons during the summer.

**Pressure on American Rail Manufacturers.**—Owing to the makers of inter-sections being unable to promise delivery under sixty (in one case ninety) days, Mr. E. A. Robert, president of the Montreal Tramways Company, has informed the City Council that there will be some delay in opening certain of the sixteen new car routes which are to be constructed.

**Brighton Tourist Cars.**—As many visitors do not care to pay a shilling to go round in a tourist car, it has been decided to issue visitors' tickets for a journey round the Beaconsfield Ditchling circular route, and, in addition, to either the Dyke Road terminus or the Race Hill, or Queen's Park terminus and back, at a combined charge of sixpence.

**London United and Middlesex Tramways to be Joined Up.**—Acton Council have referred to the Highways Committee a letter received from the Middlesex County Council conveying a proposal to link up the Council's tramways with those of the London United Electric Company. The former now terminate at the end of Horn Lane, and the latter passing the Market Place a few yards away.

**Season Tickets.**—Maidstone Council have agreed to the issue of season tickets on the tramways from the Cannon, High Street, to the "Swan" at Loose at £3 3s. per annum, £1 12s. 6d. per half-year, and 17s. 6d. a quarter. Councillor Lyle, chairman of the Tramways Committee, expressed the opinion that the tickets would prove a great convenience to the public, as well as a considerable source of revenue.

**Improved Conditions for Bradford Tramwaymen.**—The Tramways Committee on July 7 granted an advance of 2s. a week to inspectors, with a maximum wage of 45s. a week. The wages of the parcelmen are to vary according to their duties. For the conductors, who number some 300, the following scale was asked for:—5¾d. per hour on appointment, 6d. after six months' service, 6¼d. after twelve months, 6½d. after eighteen months, 6¾d. after three years, and 7d. after five years. These demands have been granted, with certain minor alterations affecting the time at which the maximum comes into operation.

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**Middlesex County Council Tramways.**—The annual report of the Light Railways Committee, recently presented to the Middlesex County Council, stated that the car mileage last year amounted to 11,483,870, and the traffic receipts to £461,043, an earning of 9.65d. per mile. Although the mileage had increased by one million, the receipts had only increased by £1,500. The earnings in previous years had always been upwards of 10d. or 11d. a mile. The capital expenditure on the undertaking amounts to £1,796,083. An agreement is in course of preparation for through running between Finchley and Holborn (*viâ* Wood Green and Caledonian Road), Waltham Cross and Smithfield, Muswell Hill and Bloomsbury, and New Southgate and Aldersgate Street (*viâ* Green Lanes and Essex Road).

**Progress of Nottingham-Ripley Tramways Construction.**—Before the end of July it is expected that the Heanor-Cinderhill portion of the tramways in course of construction from Nottingham to Ripley will be opened for traffic. The total length of the line is fourteen miles, and in laying it five railway bridges have been widened or rebuilt. Widenings have been effected at 75 places, but Mr. W. H. B. Wright, the engineer to Messrs. Balfour, Beattie and Co., states that no great difficulties have had to be encountered. The work has been in progress about thirteen weeks, and the line passes through Kimberley, Giltbrook, Hilltop, Eastwood, Langley Mill, Heanor, Codnor, Loscoe, and Ripley. The main generating station is at Ilkeston, and there are eight sub-stations. Nottingham Tramways Committee have agreed to link the Cinderhill section with their tramways at Basford, and there will be through running.

**Damages Against Llanelly Traction Company.**—In an action heard at Llanelly County Court the Traction Company were sued for £100 damages in respect of injuries sustained during an assault alleged to have been committed by the company's employees. Wm. Griffiths, the plaintiff, gave evidence that he boarded a car near the Post Office. The conductor said, "Go down and wait for another car." It was raining heavily at the time, and he refused to alight. The conductor was alleged to have then caught him by the throat and struck him, knocking out a tooth. When the car stopped the motorman in pulling him off the car wrenched plaintiff's arm, and as a result he had been unable to follow his employment since March 1. Three passengers gave evidence for the plaintiff. The conductor denied plaintiff's version, and said the man struck him after having boarded the car while in motion against witness's instructions. The motorman, a passenger, and Mr. C. Tattam, the tramways superintendent, also gave evidence. The jury brought in a verdict for plaintiff, and assessed the damages at £50.

**Assessment on Net Income or on Car Mileage?**—Stoke Newington Council have decided to assess the London County Council tramways in that borough not upon the net income of the undertaking but upon car mileage, of which that in Stoke Newington was approximately a fifty-fifth part. Of the total estimate of a quarter of a million, Stoke Newington claims an amount of £5,545 for which they should receive rates. This is an increase from £3,200, which was the assessment before the electrification of the Green Lanes track. The County Council have asked to be placed in a provisional list for the purpose of reducing the present assessment.

**Stalybridge Joint Tramways Board's Problems.**—Mossley Council at their July meeting agreed to pay the sum of £2,281 as their share of the loss of £9,124 which had resulted on the past year's working of the Stalybridge, Hyde, Mossley and Dukinfield Joint Tramways and Electricity Board. Alderman Clark, chairman of the Tramways Committee of the Board, said the loss was due to unforeseen circumstances. Referring to complaints as to the cars causing passengers to miss trains, he observed that on a small system, and with single lines, they could not run cars as regularly as on one with double lines. Cars could not be run to meet trains. After the last accident the shed at Mossley was closed on the recommendation of the Government inspector. It was better for the cars all to be at one shed, where they could be properly inspected before turning out. The Mayor said the bad year was chiefly caused by the tramwaymen's strike, the coal strike, the cost of coal, and the breakdown of plant. Their great difficulty was that the cars were only earning 8d. per mile when they should be earning 10d., and the problem was how to get the other 2d. The electricity department was doing fairly well, and would, he hoped, be able to give a helping hand next year.

## CONTRACTS AND ORDERS.

**Siemens Bros.' Dynamo Works** are supplying Tantalum traction lamps to Rochdale tramways.

**Edgar Allen and Co.** have received a contract for the supply of points and crossings to Southend Council.

**United Electric Car Company** have obtained the contract for supplying fourteen top covers to Burnley tramways.

**West Ham Council** have accepted the tender of J. Baker and Co., of Rotherham, for supplying 32in. steel tyres to the tramways department.

**The Albion Motor Car Company, Limited,** Scotstoun, have recently received orders for two 30-cwt. Albion motor cars for Christchurch Tramways Board.

**The Daimler Company, Limited,** have obtained a contract for the supply of spares and other accessories required for three motor omnibuses, to Rotherham tramways department, at £432.

**Carlisle Council** have placed a contract with Pratchitt Bros. for the supply and erection of a coal conveyor and bunker at £1,055, and with Babcock and Wilcox, Limited, for steam and water pipes at £395.

**Siemens Bros. Dynamo Works** have been awarded a contract for the annual supply of Wotan lamps for office lighting and of Tantalum lamps for car lighting to South Shields tramways.

**Regina, Canada.**—The City Commissioners of Regina, Saskatchewan, have just ordered from Bruce, Peebles and Company, Limited, through that firm's Eastern Canadian agents, a 1,200 k.w. motor converter (Peebles la Cour patents).

**C. and J. Webb and Co., Limited,** have received a contract from Yarmouth Council to supply tramwaymen's overcoats at the following prices:—For motormen, 24s. 10d. each; conductors, 23s. 7d.; inspectors, 36s. 9d.; chief inspector, 38s. 3d.

**Newport Council** have accepted the following tenders:—Switchgear (with British Thomson-Houston switches), Bertram Thomas; 100 tons of tramway rails at £7 15s. per ton, Walter Scott, Limited; rewinding turbo-alternator, General Electric Company.

**Walsall Council** have accepted the tender of the Harris Patent Feed Water Filter (1910), for a water softener for £345, and of Normans, Limited, for erecting a new steel and iron building for the additional boiler house at the electricity station for £397.

## PERSONAL.

**Mr. H. King,** late traffic superintendent of the Merthyr Electric Traction Company, has been presented with a testimonial recording the esteem in which he is held by the staff and employees. Mr. King has been appointed tramways manager at Aberdare.

**Mr. Francis Husband** has resigned his position with the London County Council tramways to take up the position of engineer and director with the Electrical Contracts and Maintenance Company, Limited, Sanctuary House, Westminster, S.W., as from July 1.

**Mr. G. Webster,** who has been the Rochdale Corporation tramways traffic superintendent for the last ten years, has been recommended by the Tramways Committee for appointment as general manager, in succession to Mr. J. S. D. Moffet, now manager of the West Ham tramways.

**Mr. Arthur Ellis,** the general manager and electrical engineer, and the staff of Cardiff tramways were heartily praised for their work during the past year by Sir John Courtis, the chairman of the Tramways Committee, when proposing the adoption of the annual report on the working of the tramways.

**Mr. F. Buckley,** general manager of Wigan Corporation tramways, was referred to in terms of warm praise by the employees at their annual outing, for his efforts to bring about a satisfactory solution of the question of improved conditions of employment. A resolution was passed thanking the Tramways Committee for their favourable response to the men's application.

**Mr. J. Dalrymple,** general manager Glasgow Corporation tramways, has been authorised to visit the most important cities in America where tramways are in operation, with a view to making himself acquainted with the most modern and up-to-date method of tramway traction. In view of the proposal to construct a new bridge over the Clyde, the Master of Works is to visit places in America where different types of opening bridges may be seen.

**Aldermen J. Clark, J.P., and R. Wood,** the chairmen of the Tramways and Electricity Committees of the Stalybridge and District Joint Tramways Board, were referred to in terms of commendation at a meeting of the Mossley Council, Councillor Sykes remarking that the members of the Joint Board were proud of the two chairmen. Expressing a hope for a more successful future for the undertaking, he said they had made application to borrow a sum of £25,000. An inspector held an inquiry, and many inquiries were made as to the management and general position. The opposition had been left without a leg to stand on. If they had had a better lead at the start and more expert advice they would have saved thousands of pounds. Another member bore testimony to the ability and diligence of Messrs. Schofield and Blackmore, the chief officers.

## FINANCIAL REPORTS AND MEETINGS.

**Torquay Tramways Successful Working.**—For the first half of the year the traffic returns of the Torquay Tramways Company show an advance of £1,200 over the corresponding period last year.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended July 11 amounted to £50,686. Upon such of the lines as were working both last year and this year the receipts show an increase of £558 upon the week.

**London Electric Railway Dividends.**—For the past half-year: Metropolitan District, at the rate of 2½ per cent. per annum on the 5 per cent. second preference stock; London Electric Railway, at the rate of 1 per cent. per annum on the ordinary stock; Central London, at the rate of 3 per cent. per annum on undivided ordinary stocks, and at the rate of 4 per cent. per annum on the preferred ordinary stock; City and South London, at the rate of ¼ per cent. per annum on the ordinary stock; Underground Electric Railways, full distribution on the income bonds at the rate of 6 per cent. per annum.

**Electric Construction Company.**—At the annual meeting of the Electric Construction Company in London on July 15, Mr. P. E. Beecheroft, who presided, said the net profit had increased from £20,304 to £27,500. Their works had been fully employed, and better prices had prevailed. They had been able to handle an increased output at comparatively little additional cost in the way of fixed factory charges. It was proposed to pay a dividend of 5 per cent. on the ordinary shares, and transfer £10,600 to the reserve, leaving to be carried forward £6,899. The report was adopted.

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**Argentine Railway Feeders.**—Some time ago the Minister of Public Works of the Province of Buenos Ayres submitted to the Legislature a project which authorised the issue of a loan for $3,500,000 gold for the installation of portable railways of 50 centimetre gauge to be constructed in the highways in various parts of the province and act as feeders to the network of main lines. Messrs. Muller and Passman applied to the Government for permission to construct 300 kilometres of line of this system at a cost of $4,800 a kilometre. The department of engineers reported favourably on the project, but the department of highways were against it. The Minister of Public Works will shortly grant the concession asked for.

**The Purchase of Perth Electric Tramways, Limited.**—At an extraordinary meeting of the Perth Electric Tramways, Limited, Mr. O. Wethered presiding, the shareholders passed a resolution winding up voluntarily, to enable the directors to carry out the sale of the property to the Government. The chairman said there would be no difficulty in at once making a distribution, probably £1 per share, the distribution of the balance of the assets following as soon as the necessary details of the liquidation are carried out. Mr. Stoneham, who seconded, said that the Government had made a good bargain, and as they had raised the loan at a little over 4 per cent., if they carried on the tramway as the company had carried it on, they would no doubt be receiving something like 10 per cent. upon their money.

**General Electric Company.**—Presiding at the annual meeting of the General Electric Company in London on July 10, Mr. H. Hirst said that the net trading profits and income from investments for the past year amounted to £145,260, against £133,507 for 1911-12, to which must be added the balance brought forward, which gave them a total of £177,311 to be dealt with, against £145,777. They proposed to pay this year 10 per cent. on their ordinary shares, against 7½ per cent. last year. Certain of their manufacturing departments, producing specialities, had been turned, for purposes of policy, into separate companies, so that they could take as partners experts in specific lines. Their investments under that heading amounted to about £100,000. There was an ever increasing demand for electrical power for use in small and big industries; they were on the threshold of a big development in electrical heating and cooking, and the electrification of railways was coming fast.

**Croydon Corporation Tramways.**—The report of the general manager, Mr. T. B. Goodyer, to the Tramways Committee, shows that the total receipts for the year ended March 31 amounted to £92,463, and the working expenses to £66,218. Including bank interest there is a gross balance of £27,153, a decrease as compared with the previous year of £6,434. After providing for interest on capital, £7,993; contribution to sinking fund, £7,428; and income-tax, £1,145; there is a net balance of £10,586 (a decrease of £6,717). Of this sum £3,000 has been paid in aid of rates, and £7,586 has been transferred to the renewals fund. The gross balance is equal to 0.53 per cent. on the capital outlay, and the net balance to 3.72 per cent. The percentage of expenses to total revenue is 70.01. Unfavourable weather and motor omnibus competition, increased rates, increased power costs, due to the additional mileage, increased cost of permanent way repairs, etc., are mentioned in explanation of the decrease in the net results. The total receipts per car mile were 8.46d., a decrease of .85d. as compared with the previous year. The average profit per passenger has decreased from .168d. in 1912 to .087d. in 1913. The consumption of electrical energy was 2,484,093 units, an average of .938 unit per car mile, the cost being 1.505d. per car mile (a reduction of .040d.), while the average cost per unit is 1.604d. Mr. Goodyer's remarks on motor omnibus competition are given elsewhere in this issue.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended July 12 amounted to £259,103, or £6,051 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £95 10s. 9d. per track mile, an increase of 14s. 11d. per mile as compared with last year.


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## COPPER AND ALUMINIUM MARKET.

July 18, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, July 18. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 63 17 6 | 62 15 0 | 77 2 6 |
| ,, ,, (three months) .. | 63 12 6 | 63 0 0 | 77 15 0 |
| Electrolytic Copper—bars or ingots | 66 0 0 | 67 0 0 | 80 0 0 |
| Aluminium—bars or ingots .. .. | 83 0 0 | 89 0 0 | 76 10 0 |

## COAL MARKET.

July 18, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, July 18. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 | 25 6 | No Quotations owing to transport workers strike. | 22 9 |
| Best Seconds.. .. .. | 24 0 | 24 0 | | 21 4½ |
| Ordinary Drys .. .. | 21 0 | 21 0 | | 19 3 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | | 18 9 |
| Best Washed Peas .. .. | 19 6 | 19 6 | | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 | 21 0 .. | 17 9 .. | 18 9 |
| Best Seconds .. .. | 19 6 | 19 6 .. | 17 0 .. | 17 4½ |
| Ordinary Drys .. .. | 16 6 | 16 6 .. | 15 0 .. | 15 3 |
| Best Washed Nuts .. .. | 16 6 | 16 6 .. | 14 0 .. | 14 9 |
| Best Washed Peas .. .. | 15 0 | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 3 | 15 6 .. | 13 9 .. | 11 10½ |
| Best Seconds .. .. | 13 6 | 13 6 .. | 11 9 .. | 9 3 |
| Smalls .. .. .. | 9 6 | 10 0 .. | 10 9 .. | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | July 15 | £47,448 | £55,646 | 28 | £1,564,389 | +£134,217 |
| Auckland..... (28 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,993 |
| Ballarat and Bendigo | June 1 | 819 | 825 | 9 | 8,791 | + 5 |
| Bombay ..... Rs. | June 20 | 2,852 | 3,232 | 25 | 78,206 | + 3,628 |
| Brazilian St. Rly. Mira | May | 40,507 | 44,820 | 43 | 447,247 | + 9,595 |
| Brazilian Traction..... | July 5 | 80,183 | 93,829 | 27 | 2,444,310 | + 352,481 |
| Brisbane..... | June | 21,570 | 25,013 | 26 | 151,003 | + 43,349 |
| British Columbia .....$ | May | 491,826 | 566,128 | 47 | 6,269,123 | +1,017,780 |
| Buenos Aires Pt. & City | Feb. | 6,269 | 6,726 | 9 | 12,697 | — 1,100 |
| Buenos Aires Lacroze.. | June | 41,518 | 44,179 | 52 | 529,749 | + 43,906 |
| Calcutta.....Rs. | July 12 | 60,560 | 66,954 | 28 | 17,70,762 | + 81,843 |
| Cape Town ..... | April | 11,771 | 12,175 | 17 | 51,462 | + 3,148 |
| Carthagena & Herreria | June | 1,671 | 2,158 | 26 | 17,331 | + 6,498 |
| East India ..... | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie ..... | June | 3,351 | 2,854 | 26 | 17,226 | — 1,431 |
| La Plata..... | June | 3,557 | 4,846 | 26 | 31,571 | + 6,882 |
| Lima..... | June | 32,175 | 31,200 | 26 | 198,227 | + 8,110 |
| Lisbon ..... Mrs. | Jan. | ... | 147,848 | 4 | 147,848 | ... |
| Madras (28 days) Rs. | July 15 | 25,218 | 28,429 | 28 | 347,657 | + 25,781 |
| Melbourne ..... | May | ... | 62,000 | 21½ | 324,000 | ... |
| Mexico .....$ | June | 558,355 | 588,780 | 26 | 3,265,540 | — 5,881 |
| Montevideo..... | June | 26,392 | 28,820 | 34 | 258,427 | + 20,005 |
| Para ..... | July 13 | 3,917 | 3,822 | 32 | 130,951 | + 3,262 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth ..... | April | 3,420 | 4,357 | 17 | 16,388 | + 1,312 |
| Shanghai .....$ | June 11 | 20,416 | 25,200 | 23 | 466,252 | + 35,720 |
| Singapore .....$ | July 12 | 10,504 | 12,338 | 28 | 326,313 | + 34,687 |
| Toronto .....$ | May | 693,015 | 811,872 | 21 | 3,840,280 | + 524,541 |
| Winnipeg.....$ | May | 298,743 | 326,827 | 21 | 1,651,336 | + 143,036 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London..... | July 12 | £4,146 | £4,508 | 28 | £142,528 | +£13,130 |
| City and South London | ,, 12 | 2,841 | 2,771 | 28 | 79,704 | — 7,791 |
| Liverpool Overhead..... | ,, 13 | 1,707 | 2,379 | 28 | 46,973 | + 3,625 |
| London Electric..... | ,, 12 | 12,600 | 13,270 | 28 | 396,235 | + 4,210 |
| Mersey ..... | ,, 12 | 2,036 | 2,451 | 28 | 62,697 | + 4,209 |
| Metropolitan ..... | ,, 13 | 17,850 | 18,013 | 28 | 470,739 | + 3,285 |
| Metropolitan District... | ,, 12 | 12,422 | 13,044 | 28 | 369,220 | + 14,706 |


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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | July 9 | £1,622 | £1,570 | + £52 | 6 | £9,186 | + £303 |
| Ayr Corporation ..... | ,, 12 | 528 | 420 | — 108 | 8 | 3,080 | + 58 |
| Bath Electric ..... | ,, 9 | 1.103 | 1,226 | + 123 | 28 | 24,634 | + 697 |
| Birmingham Corp. ..... | ,, 12 | 10,904 | 11,513 | + 609 | 15 | 170,906 | + 12,146 |
| Blackburn Corporation | ,, 9 | 1.317 | 1,388 | + 71 | 15 | 19,573 | + 1,209 |
| Blackpool & Fleetwood | ,, 12 | 1,342 | 1,483 | + 141 | 2 | 2,699 | — 31 |
| Blackpool Corporation | ,, 10 | 2.664 | 3,165 | + 501 | 14 | 22,282 | + 1.401 |
| Bolton Corporation ..... | ,, 13 | 2,738 | 3,112 | + 374 | 15 | 40,830 | + 1,794 |
| Bournemouth Corp..... | ,, 16 | 2.039 | 2.214 | + 175 | 15 | 30,787 | + 2,469 |
| Bradford Corporation.. | ,, 12 | 6,155 | 5,988 | — 167 | 15 | 88,864 | + 3,722 |
| Brighton Corporation.. | ,, 14 | 1.171 | 1,188 | + 17 | 15 | 15,466 | — 6 |
| Bristol ..... | ,, 11 | 7,818 | 9,503 | + 1,685 | 27 | 211,945 | + 26,970 |
| British Elec. Traction - | | | | | | | |
| Airdrie..... | July 11 | 387 | 360 | — 27 | 28 | 9,238 | + 1,224 |
| Barnsley ..... | ,, 11 | 209 | 366 | + 157 | 28 | 7,153 | + 2,491 |
| Barrow ..... | ,, 11 | 484 | 444 | — 40 | 28 | 10,625 | + 614 |
| Birmg.& Mid. Joint- | | | | | | | |
| Birmingham Dist. .. | July 11 | 987 | 965 | — 22 | 28 | 27,972 | + 1,342 |
| Dudley—Stourbridge | ,, 11 | 979 | 956 | — 23 | 28 | 25,382 | + 2,143 |
| South Staffordshire.. | ,, 11 | 974 | 924 | — 50 | 28 | 27,128 | + 2,146 |
| Wolverhampton Dist | ,, 11 | 585 | 570 | — 15 | 24 | 14,156 | + 1,044 |
| Devonport ..... | ,, 11 | 516 | 640 | + 124 | 28 | 14,787 | + 59 |
| Gateshead ..... | ,, 11 | 1,004 | 1,526 | + 432 | 28 | 33,175 | + 5,120 |
| Gravesend & N'thfleet | ,, 11 | 209 | 269 | + 60 | 28 | 6 230 | + 653 |
| Greenock—P.Gl'sgow | ,, 11 | 686 | 789 | + 103 | 28 | 22,973 | + 1,427 |
| Jarrow ..... | ,, 11 | 146 | 150 | + 4 | 28 | 3,305 | + 205 |
| Kidderminster ..... | ,, 11 | 174 | 150 | — 24 | 28 | 3,150 | + 94 |
| Merthyr ..... | ,, 11 | 207 | 223 | + 16 | 28 | 5.961 | + 675 |
| Metropolitan ..... | ,, 11 | 9.711 | 9,139 | — 572 | 28 | 247,976 | + 5,133 |
| Middleton ..... | ,, 11 | 425 | 413 | — 12 | 28 | 9,547 | + 516 |
| Oldham—Ashton..... | ,, 11 | 679 | 673 | — 6 | 28 | 16,927 | + 250 |
| Peterborough ..... | ,, 11 | 326 | 405 | + 79 | 28 | 4.564 | + 881 |
| Potteries ..... | ,, 11 | 2,174 | 2.061 | — 113 | 28 | 57,974 | + 7.151 |
| Rotheesay ..... | ,, 11 | 478 | 552 | + 74 | 28 | 4,559 | + 471 |
| Sheerness ..... | ,, 11 | 63 | 65 | + 2 | 28 | 1.388 | + 88 |
| South Metropolitan.. | ,, 11 | 1,013 | 879 | — 134 | 28 | 22 658 | — 408 |
| Southport ..... | ,, 11 | 898 | 477 | + 79 | 28 | 8,357 | + 503 |
| Swansea ..... | ,, 11 | 1,224 | 1,333 | + 109 | 28 | 33,990 | + 3,425 |
| Taunton ..... | ,, 11 | 49 | 48 | — 1 | 28 | 1,286 | + 97 |
| Tynemouth..... | ,, 11 | 371 | 360 | — 11 | 28 | 6,433 | + 558 |
| Weston-super-Mare.. | ,, 11 | 331 | 340 | + 9 | 28 | 8,089 | + 492 |
| Worcester ..... | ,, 11 | 347 | 407 | + 60 | 28 | 8,131 | + 435 |
| Wrexham & District.. | ,, 11 | 124 | 128 | + 4 | 28 | 3,201 | + 300 |
| Yorks (Woollen) Dist | ,, 11 | 1,292 | 1,191 | — 101 | 28 | 31,628 | + 2,207 |
| Burnley Corporation .. | ,, 12 | 1,445 | 1,631 | + 186 | 13 | 21,761 | + 2,570 |
| Burton-on-Trent Corp | ,, 13 | 297 | 287 | — 10 | 15 | 4,238 | + 120 |
| Bury Corporation..... | ,, 12 | 1 496 | 1,516 | + 110 | 16 | 20,536 | + 368 |
| Cardiff Corporation..... | June 28 | 3,876 | 2,887 | — 989 | 13 | 34,224 | + 3,528 |
| Chatham and District.. | July 10 | 956 | 988 | + 32 | 27 | 24,122 | + 1,120 |
| Chesterfield Corp. ..... | ,, 10 | 235 | 242 | + 7 | 14 | 3,644 | + 482 |
| Colne & Trawden..... | ,, 12 | 322 | 370 | + 48 | 28 | 7,390 | + 484 |
| Cork Electric..... | ,, 10 | 550 | 564 | + 14 | 27 | 13,164 | — 116 |
| Croydon Corporation .. | ,, 4 | 1,870 | 1,860 | — 40 | 13 | 22,949 | — 3,307 |
| Darlington Corporation | ,, 5 | 233 | 250 | + 17 | 14 | 3 463 | + 345 |
| Derby Corporation ..... | ,, 12 | 1,016 | 983 | — 30 | 15 | 14,616 | + 1,834 |
| Dover Corporation .... | ,, 12 | 311 | 269 | — 42 | 15 | 3,498 | — 155 |
| Dublin & Lucan ..... | ,, 11 | 158 | 184 | + 26 | 11 days | 260 | + 3 |
| Dublin United ..... | ,, 11 | 6 337 | 6,071 | — 266 | 27 | 161,922 | + 2.803 |
| Dundee City ..... | ,, 9 | 1,223 | 1,279 | + 56 | 8 | 10,543 | + 841 |
| East Ham Corporation | ,, 12 | 1,113 | 955 | — 158 | 15 | 15,723 | — 39 |
| Exeter Corporation .... | ,, 11 | 346 | 377 | + 31 | 15 | 5,018 | + 88 |
| Glasgow Corporation .. | ,, 12 | 19.131 | 19,518 | + 387 | 6 | 124,265 | + 7,414 |
| Glossop(U.Elec.Supply) | ,, 12 | 133 | 135 | + 3 | 28 | 3,562 | + 467 |
| Halifax Corporation .. | ,, 8 | 2.175 | 2.142 | — 33 | 14 | 30,231 | — 245 |
| Hastings & District.... | ,, 10 | 1,201 | 1.101 | — 99 | 28 | 25.007 | + 1.174 |
| Huddersfield Corp. ..... | ,, 12 | 2,324 | 2,126 | — 198 | 15 | 31,837 | + 1,610 |
| Hull Corporation ..... | ,, 12 | 2.988 | 3,128 | + 140 | 15 | 45,508 | + 2,582 |
| Ilford U.D.C. ..... | ,, 12 | 576 | 460 | — 116 | 15 | 6,903 | — 1,197 |
| Ilkeston Corporation .. | ,, 16 | 138 | 142 | + 4 | 16 | 2.043 | + 445 |
| Ipswich Corporation .. | ,, 12 | 530 | 499 | — 31 | 15 | 6,687 | + 31 |
| Isle of Thanet l..... | ,, 12 | 1.273 | 1,315 | + 42 | 41 | 18.6 8 | + 493 |
| Kilmarnock Corp. ..... | ,, 12 | 173 | 171 | — 2 | 8 | 1.488 | + 85 |
| Lanarkshire ..... | ,, 10 | 1 574 | 1,637 | + 63 | 27 | 44,916 | + 6.049 |
| Lancashire United ..... | ,, 9 | 1.640 | 1,578 | — 52 | 27 | 39,806 | + 3,773 |
| Leeds City ..... | ,, 12 | 8,509 | 8,250 | — 259 | 15 | 123,864 | + 7,875 |
| Leicester Corporation.. | ,, 12 | 2,838 | 2,805 | — 33 | 28 | 76,958 | + 7,544 |
| Leith Corporation ..... | ,, 12 | 877 | 755 | — 122 | 8 | 6.257 | + 229 |
| Liverpool Corporation.. | ,, 12 | 12,924 | 17,097 | + 4,173 | 27 | 350,511 | + 23,735 |
| Llandudno & Colwyn B. | ,, 11 | 488 | 546 | + 58 | 32 | 7.907 | + 795 |
| London County Council | ,, 9 | 43 697 | 42,350 | — 1,347 | 14 | 605,587 | — 21,610 |
| London Gnl. Omnibus.. | ,, 12 | 61,481 | 66,862 | + 5,381 | 28 | 1,714,176 | + 381 061 |
| London United ..... | ,, 11 | 7 299 | 6,582 | — 717 | 28 | 188 735 | — 2,030 |
| Lowestoft Corporation | ,, 5 | 219 | 219 | + 9 | 30 | 6,606 | + 353 |
| Maidstone Corporation | ,, 3 | 209 | 233 | + 24 | 14 | 2.771 | + 182 |
| Manchester Corp. ..... | ,, 12 | 18,102 | 18,056 | — 46 | 15 | 262,495 | + 11,282 |
| Nelson Corporation..... | ,, 5 | 153 | 173 | + 20 | 14 | 2.865 | + 63 |
| N'castle-on-Tyne Corp | ,, 12 | 4 392 | 4.648 | + 256 | 15 | 72,043 | + 5,676 |
| Newport (Mon.) Corp.. | ,, 12 | 741 | 771 | + 30 | 15 | 11.047 | + 686 |
| New St. Helens & Dist.. | ,, 9 | 909 | 1,038 | + 129 | 2 | 1,251 | + 153 |
| Northampton Corp ..... | ,, 11 | 622 | 575 | — 47 | 14 | 8,463 | + 200 |
| Nottingham Corp. ..... | ,, 10 | 3,387 | 3.384 | — 3 | 14 | 48,413 | + 1,467 |
| Oldham Corporation .. | ,, 13 | 2,262 | 2,626 | + 364 | 16 | 34,696 | + 1.574 |
| Portsmouth Corp..... | ,, 12 | 2,932 | 2,584 | — 348 | 15 | 32,715 | — 572 |
| Preston Corporation .. | ,, 9 | 847 | 1,118 | + 271 | 15 | 13.314 | + 1,119 |
| Provincial ... ..... | ,, 12 | 2,171 | 2,302 | + 131 | 41 | 71,414 | + 3,575 |
| Reading Corporation .. | ,, 10 | 714 | 702 | — 12 | 14 | 9 889 | + 457 |
| Rochdale Corporation | ,, 12 | 1,741 | 1,854 | + 114 | 15 | 23,876 | + 434 |
| Rotherham Corp. ..... | ,, 16 | 768 | 970 | + 202 | 15 | 14,712 | + 3,784 |
| Salford Corporation .. | ,, 14 | 5,436 | 6,211 | + 775 | 15 | 79,515 | + 1.878 |
| Sheffield Corporation.. | ,, 13 | 7,077 | 7,318 | + 241 | 16 | 115,899 | + 11,748 |
| Southampton Corp. .... | ,, 9 | 1,363 | 1,354 | — 9 | 14 | 18,418 | + 383 |
| Southend-on-Sea Corp | ,, 9 | 961 | 1,040 | + 129 | 15 | 12,352 | + 1.200 |
| South Shields Corp..... | ,, 12 | 671 | 733 | + 62 | 15 | 10,507 | + 1.295 |
| Sunderland Corp. ..... | ,, 13 | 1.439 | 1 505 | + 66 | 15 | 21,121 | + 2 048 |
| Sunderland District .. | ,, 9 | 456 | 519 | + 83 | 35 | 19,172 | + 3.598 |
| Swindon Corporation .. | ,, 9 | 163 | 170 | + 7 | 14 | 2,245 | + 197 |
| Trys.(M.E.T.)Omn. Co. | ,, 12 | ... | 5,815 | ... | 28 | 70,707 | ... |
| TynesideTrys.&Tmrds | ,, 9 | 508 | 501 | — 7 | 2 | 623 | — 58 |
| Wallasey Corporation | ,, 12 | 1,242 | 1.470 | + 228 | 15 | 18 175 | + 1,285 |
| Walsall Corporation .. | ,, 12 | 607 | 614 | + 7 | 28 | 17,019 | + 1,227 |
| Walthamstow U. D.C. | ,, 12 | 851 | 708 | — 143 | 12 | 11,214 | — 638 |
| Warrington Corp ..... | ,, 10 | 453 | 544 | + 91 | 15 | 6,611 | + 381 |
| West Ham Corporation | ,, 10 | 2,679 | 2.718 | + 39 | 14 | 40,087 | + 816 |
| Wigan Corporation .... | ,, 10 | 1,341 | 1.562 | + 221 | 14 | 21,313 | + 2,358 |
| Wolverhampton Corp | ,, 16 | 1.148 | 1.139 | — 9 | 16 | 16,642 | + 716 |
| Yorkshire (W. Riding) | ,, 13 | 1,582 | 1,495 | — 87 | 28 | 39,591 | + 4,201 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week. | Quotations, July 18. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 79 — 82 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¼ — 5 |
| 5 | Do. 5½% Cum. 2nd Pref. | — 1/16 | 4 1/16 — 4 3/16 |
| 100 | Do. 4% Deb. Stk. Red. | ... | 90½ — 92½ |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 94½ — 96½ |
| 100 | Do. 5% Deb. Stk. Red.... | + ⅛ | 96 — 98 |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 99 —101 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum. Pref | ... | 23/32 — 25/32 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13¼ — 14¼ |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref ... | ... | 11 — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | + 2 | 87 — 89 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 6¾ — 7¾ |
| 5 | Do. do. 5% Cum. Pref. | ... | 4¼ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 97 —100 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5¼ — 6¼ |
| 10 | Do. do. 4% Cum. Pref. | ... | 7 — 7¼ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 94 — 96 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | + 1 | 122 —127 |
| 100 | Do. Pref. Ord. Stock | + 2 | 111 —116 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | + 1½ | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —102 |
| 100 | Do. 4% Perpetual Cons. Deb. Stk. | ... | 95 — 97 |
| 100 | British Elec. Traction Co., Lim.. 6% Cum. Pref. | ... | 78 — 81 |
| 100 | Do. 7% Non-Cum. Pref. | ... | 38 — 41 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 8 — 10 |
| 100 | Do. Deferred Ord. Stock | ... | 3½ — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock | ... | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 73 — 77 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 92 — 96 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 98¼ —100½ |
| 5 | Calcutta Tramways Co., Limited, Ord. | ... | 5⅝ — 6⅛ |
| 5 | Do do. 5% Cum. Pref. | ... | 4 3/16 — 5 1/16 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., | ... | 11/16 — 13/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | — ⅛ | 3 — 3¼ |
| 190 | Do. 5% Debs.. Red. | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5¼ — 5⅝ |
| 100 | Do. 4% Debenture Stock Red, 1985 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ½ | 93 — 95 |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | — ⅛ | — 11⅛ xd |
| 10 | Do. do. 6% Pref. | ... | — 12¼ |
| 100 | Do. do. "A" Red. | + 1 | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 79½ |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 8½ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | 5/16 — 7/16 |
| 1 | Do. do. 6% Cum Pref. | ... | 13/32 — 15/32 |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. | ... | 4 — 4½ |
| 10 | Do. do. 6% Cum. Pref. | ... | 7 — 7⅛ |
| 100 | Do. do. 4½% Deb. Stock | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2½ — 2⅝ |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 13/16 — 15/16 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 33/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. | .. | 10 — 10½ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1 3/32 — 1 1/16 |
| 1 | Do. 6% Cum. Pref. | ... | 1 — 1⅛ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | 31/32 — 1 1/32 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 92½ — 94½ |
| 100 | Do. Do. 5% Cum, Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 57 — 61 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¼ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 87½ — 90½ |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | — ½ | 108 —111 |
| $1,000 | Do. do. 5% Bds. | + ½ | 99 —101 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 1 1/16 — 1 1/8 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 84 — 88 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 91½ — 94½ |
| $100 | Mexico Tramways Co., Common Stock | + 2 | 83 — 92 xd |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 89 — 92 |
| 100 | Do. 6% 50-yr. Mort. Bonds | — 3 | 87 — 90 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd | — 1/32 | 1 3/32 — 1 5/32 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 6½ — 6¼ |
| 10 | Do. do. 5% Cum. Pref. | ... | 6⅛ — 6⅜ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | — ⅛ | 6 — 6¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¼ — 5 |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. | ... | 1⅛ — 1⅜ |
| 100 | Do. do. 5% 1st Mt. Deb. Stk. Rd | ... | 102½ —105½ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 3/32 — 5/32 |
| 100 | Do. 4½% Debenture Stock, Red. | ... | 13/16 — 15/16 |
| 1 | Provincial Tramways, Lim.. Ord. | ... | 82 — 85 |
| 10 | Do. 5% 1st Deb. Stock | ... | 31/32 — 1 1/32 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 97⅛ —100⅛ |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. | — ⅛ | 24 — 27 |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 5 — 5⅛ |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 95 — 97 |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | 85 — 87 |
| $500 | 1st Mt. 30-yr 5% Gold Bonds | + 1 | 97 — 99 |
| 100 | 5% 50-yr. Mort. Gold Bonds | + ½ | 91½ — 93½ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | ... | 99 —101 |
| 10 | Shanghai Elec. Construction Co. | ... | 8¼ — 9⅛ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 83 — 89 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 5/8 — ¾ |
| 100 | Do. do. 4% Deb. Stk. | ... | 63 — 68 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 96 — 98 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 93 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 86 — 88 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83¼ — 92¼ |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4⅛ — 4¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¼ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 97 — 99 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 98½ —101½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. | ... | 11/16 — ¾ |
| 5 | Do. do. 6% Cum. Pref. | ... | 3 5/16 — 3 7/16 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 5. | LONDON, SATURDAY, JULY 26, 1913. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### BOURNEMOUTH CORPORATION TRAMWAYS.

The Tramways Committee of the County Borough of Bournemouth are prepared to receive tenders not later than August 27, 1913, for :—

Reconstruction of Permanent Way (equal to about 3 miles single track).

Specifications, quantities, and forms of tender may be obtained on application to the undersigned on payment of a deposit of £2, which will not be returned except on receipt of a *bonâ-fide* tender.

Additional copies may be had on payment of £1 1s. each, which will not be returned.

The Committee do not bind themselves to accept the lowest or any tender.

I. BULFIN, B.A., A.M.I.C.E., M.I.M.E., M.I.E.E.,
General Manager.

Tramways Offices, Bournemouth.

### COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for E.H.T. Feeder Panel.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Five shillings each will be charged for extra copies of specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for E.H.T. Feeder Panel," and delivered not later than 12 o'clock noon on Wednesday, August 6.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

### COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for twelve months' supply of Earthenware Conduit.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Five shillings each will be charged for extra copies of specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Earthenware Conduit," and delivered not later than 12 o'clock noon on Wednesday, August 6, 1913.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

### EAST INDIAN RAILWAY.

The East Indian Railway Company is prepared to receive tenders for the supply and delivery of :—

Wheels and Axles,

as per specification to be seen at the Company's Offices.

Tenders to be sent to the undersigned, marked "Tender for Wheels and Axles," not later than 11 o'clock a.m. on Wednesday, the 6th day of August proximo.

The Company reserves to itself the right to divide the order, also to decline any tender without assigning a reason, and does not bind itself to accept the lowest or any tender

For each specification a fee of £1 1s. is charged, which cannot under any circumstances be returned.

By order, C. W. YOUNG,
Secretary.

Nicholas Lane, London, E.C.,
July 24, 1913.

### PLYMOUTH.

The Plymouth Corporation is prepared to receive tenders for the undermentioned works in connection with the Electricity Works of the Borough, viz. :—

Contract No. 30.—Steam Turbo-Alternator, Condenser, etc.

Contractors may not tender for a part of any contract.

Copies of the conditions, specification, and form of tender, bound up together, may be obtained from the undersigned on the deposit of one guinea for each copy, which will be returned after receipt of a *bonâ-fide* tender upon the prescribed form, and within the stated time.

Should a contractor withdraw his tender, the amount of his deposit will be forfeited.

Sealed tenders, endorsed "Contract No. 30," must be delivered to the undersigned not later than August 27, 1913.

The Corporation does not bind itself to accept the lowest or any tender.

(Signed), E. G. OKELL,
Borough Electrical Engineer.

### MUNICIPAL COUNCIL OF SHANGHAI.

The Council invite tenders for the supply and delivery f.o.b. British Port of the following :—

CONTRACT NO. 1.

Two Steam Turbo-Alternators, each of 5,000 kw. capacity, complete with Surface Condensing Plant, etc.

CONTRACT NO. 2.

Four Water-Tube Boilers, Evaporating 28,000lbs. each, with Integral Superheaters, Mechanical Stokers, Economisers, etc.

Specifications, general conditions, and forms of tenders may be obtained from Messrs. Preece, Cardew and Snell, 8, Queen Anne's Gate, Westminster, S.W., on payment of a deposit of £2 for each contract, which will be refunded on receipt of a *bonâ-fide* tender.

Extra copies of each specification can be obtained on payment of 2s. 6d. each, non-returnable.

Sealed tenders, in duplicate, endorsed "Shanghai," are to be delivered to Messrs. Preece, Cardew and Snell, 8, Queen Anne's Gate, Westminster, S.W., before 12 o'clock noon on Tuesday, August 26, 1913.

The Council do not undertake to accept the lowest or any tender, and reserve the right to accept the whole or a portion of any tender.

### COUNTY BOROUGH OF BIRKENHEAD.

The Corporation of Birkenhead are prepared to receive quotations from parties desirous of tendering for special Tramway Trackwork in manganese cast steel, comprising points and crossings.

Particulars of the material required may be obtained on application to Mr. Chas. Brownridge, M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Birkenhead.

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## LIVERPOOL CORPORATION TRAMWAYS.

ADVERTISING ON TRAMWAY CARS.

The Tramways and Electric Power and Lighting Committee are prepared to receive tenders for the exclusive right to Advertise upon the Tramway Cars for a period of seven years, commencing on the 1st August, 1914.

The number of cars, working and spare, excluding first-class cars, is 496, and the total length of line traversed 119 miles. The total mileage of the cars during 1912 amounted to 12,590,408, and the number of passengers to 134,249,967. The total resident population in the districts served by the Corporation tramway cars amounts to approximately 838,000.

Tenders must be enclosed in the envelope provided, and addressed to the "Town Clerk, Municipal Buildings, Liverpool," and forwarded through the post so as to be received by him not later than the first postal delivery on Wednesday, the 13th August, 1913.

Form of tender and specification may be obtained upon written application to C. W. Mallins, Esq., A.I.E.E., General Manager, Tramways Department, Central Offices, 24, Hatton Garden, Liverpool.

EDWARD R. PICKMERE.
Town Clerk.

Municipal Buildings, Liverpool,
July 21, 1913.

## FOR SALE.

THE OWNER OF BRITISH PATENTS, Nos. 21332 of 1906, 21333 of 1906, and 21334 of 1906, relating to "Improvements in the Manufacture of Forged Metal Car Wheels," is desirous of disposing of the patents or entering into working arrangements under license or otherwise with firms likely to be interested in the same.

Copies of the patent specifications, and full particulars can be obtained from and offers made (for transmission to the owner) to MARKS AND CLERK, 57 and 58, Lincoln's Inn Fields, London, W.C.


**COMMERCIAL MOTOR VEHICLE EXHIBITION**
AT OLYMPIA.
**JULY 18th to 26th, 1913**
(Open daily from 10 till 10.)

All the leading manufacturers of commercial vehicles—petrol, steam, electric—are represented.

**THE TRAMWAY AND RAILWAY WORLD, Stand No. 7.**

**SIMPLEX CONDUITS, Ltd.**
GARRISON LANE, BIRMINGHAM.

Makers of Simplex Steel Conduit System and

WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSE (Indicating) FUSES.

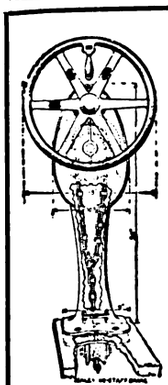
500 page Catalogue sent free on request.

**TRAMWAY SUPPLIES, Ltd.,**
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3498 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.
Robert KEARSLEY & Co., Ltd.
RIPON, England.

**MILLARS' TIMBER AND TRADING CO., LTD.**
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON." Telephone: 368. LONDON WALL.

FOR SPECIAL
**CAR VARNISH**
SEND TO
**PINCHIN JOHNSON & CO., Ltd.,**
MINERVA HOUSE,
BEVIS MARKS, LONDON, E.C.



**THE BRITISH ACKLEY BRAKE AND SUPPLY CO., Ltd.,**
WESTINGHOUSE BUILDINGS, NORFOLK STREET, LONDON, W.C.
Sole Licensors for the Manufacture of the Ackley "Adjustable" and "No Staff" Brakes in the United Kingdom, Norway, Sweden, Denmark, Belgium, Holland, and certain other territories.
The British ARCo TRADE MARK London.
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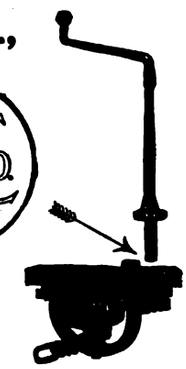


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THE
# Tramway AND Railway World

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SATURDAY, JULY 26, 1913.

THE "OCEAN"
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## THE HOUSE OF LORDS ON THE RATING QUESTION.

Tramway authorities all over the country will be keenly disappointed with the result of the appeal to the House of Lords in the case of the Tottenham Urban District Council *v.* the Metropolitan Electric Tramways, Limited. The question raised in this case, as our readers are well aware, was whether tramways should pay rates on their full net annual value, as they have had to do in the past, or whether they should for purposes of rating be considered to be railways, and therefore have the benefit of the Public Health Act, 1875, which provides, among many other things, that railways are only to pay rates on one-quarter of their full net annual value. The House of Lords, on Thursday, reversed the decision of the Court of Appeal, and restored the judgment of a Divisional Court deciding that tramways must continue to pay on the full net annual value. The judgment is briefly reported in our present issue, but it may be useful here to point out one or two surrounding features. Point was given to the case by the fact that a part of the lines worked by the tramway company in Tottenham consists of a light railway, authorised by a Light Railway Order, while another part is a tramway, authorised as such by a private Act. The light railway and the tramway in their construction, equipment and working are indistinguishable from one another, and the same cars run over both. The light railway has to pay rates on only one-fourth of its net annual value. This, of course, was settled once for all by the House of Lords in the Wakefield case in the year 1908, when it was decided, following out an express provision of the Light Railways Act, that a light railway is for all purposes, except that of passenger duty, to be deemed to be a railway, and that all enactments relating to railways shall apply. Thus the question became very pertinent whether this tramway, forming a continuation of the light railway, should not be assessed in the same way. Of course, if the answer had been in the affirmative, all tramways in England would be similarly relieved. The decision of the House of Lords shows once more the "glorious uncertainty of the law." The Divisional Court, evidently after hearing very little argument, affirmed the view of the local justices that the tramway was not a railway, reliance being placed on the old Swansea case of 1892. When the matter came before the Court of Appeal in February, 1912, Lord Justice Farwell, Lord Justice Kennedy, and Mr. Justice Warrington unanimously reversed that decision. They held that the tramway was a railway, and based themselves principally on the fact that in the words of the Public Health Act the subject which was being rated was "land used as a railway." This might seem incontrovertible; but now the House of Lords, in the persons of the Lord Chancellor, Lord Shaw, and Lord Moulton, unanimously affirm that a tramway is not a railway. They appear to waive consideration of the question whether the subject is land used as a railway, and to base themselves upon the distinction between a railway and a tramway, which they say is clearly understood both by the popular and the legal acceptation of the two terms. They also think that if a partial exemption from rates conferred by the Public Health Act was intended to extend to tramways, that Act would have made it clear in terms. In public legislation it is laid down that the word "railway" does not include "tramway," unless it is expressly made to do so by the terms of the Act. The decision comes just at a time when an agitation is growing for the relief of tramways from the special burdens placed upon them in the way of rates and liability for road maintenance, in order that they may be put in a position of greater equality with automobile passenger traffic. There is accordingly one special advantage in having the law declared at the present time, because those who are anxious to get fairer conditions for tramways have now a solid basis from which to work towards the much-needed and much-desired reform.

## ARBITRATION AT SHEFFIELD.

In response to a request from the union tramwaymen, the Sheffield Committee have reconsidered their refusal to grant time and a half for Sunday labour to motormen and conductors other than those with five years' service. Without any solicitation from the men, the Committee, however, have offered to refer the question in dispute to the arbitration of an independent person to be appointed by the Board of Trade. Thus the Committee have deprived them of any support for the proposal to take a ballot on the question of withdrawing labour, and if the national executive of the union desires their local committees to retain the confidence of municipal authorities generally they should direct the men to follow the precedent set in the case of Manchester a few years ago by submitting the matter to arbitration. At present the local committee have only decided to take the employees' opinion regarding arbitration. The lengthy review of the position of affairs which Mr. A. R. Fearnley forwarded to the secretary, in communicating their decision, leaves the men without a leg to stand upon. This is recognised by editorial writers of the Liberal and Conservative daily newspapers, the first-mentioned journal observing:—

"On broad principles our sympathies are with Labour in a desire to secure better conditions of employment, but in this case the Committee can show a splendid record of concessions which

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on the whole make the lot of the men better than that endured by similar workers in other towns. It may be urged that the tramways are a highly profitable undertaking, and that the first consideration should be the men engaged in working the service. This is not a principle from which we would dissent, but the line has to be drawn somewhere. After all, there are others interested in the success of the tramways, and it is a moot point whether or not the time has arrived for greater advantages to the public who make the success of the system. Only recently the decision was arrived at that it was inexpedient to grant cheaper fares in the early hours of the morning."

Mr. Fearnley shows that the motormen and conductors are the best paid in the United Kingdom, save for a decimal advantage in the case of West Ham, owing to conductors there being given the same rate of pay as motormen. During the last nine years, as the men admit, they have never come away empty handed from an interview with the Committee, and they acknowledge that in that period they have received concessions to the value of £15,000. After as short a period of service as three months, a conductor is permitted to qualify as a motorman, and can then reach the maximum rate of pay with twelve months' service. The system of meal reliefs is the most costly system known on any tramway, and it has only been continued at the special request of the men. The payment for hilly routes is so much higher than any rate paid in other towns that the Committee frequently refrain from quoting it. Under these conditions there are a large number of men who have recently come into the department who are receiving, within a period of from six months to two years, an advance of at least 50 per cent. upon the wages they were receiving before entering the employ of the department. That these conditions are appreciated is shown by the manager's statement that the men have brought to bear upon the department all the influence which they are capable of doing in order to secure the admission of relatives and friends, and that, almost without exception, members of the Tramways Committee and members of the Council who are not members of the Committee are inundated with applications for support of men who are desirous of entering the service. Adverting to statements that during the past two years of good trade a number of employees have left to take situations elsewhere in this country and in the Colonies, Mr. Fearnley says it should be added that a considerable number of these men have intimated their desire to come back, and as an instance it may be stated that three applications have been received during the past few days. A tabulated statement of the wages paid for the week ended July 12 shows that the highest payments to motormen were between £2 10s. and £2 13s., and the lowest between £1 15s. and £1 16s., while in the case of conductors the payments were from £2 5s. to £2 9s. and £1 8s. to £1 9s. Dealing with assertions made with reference to the wages of timekeepers, pointsmen, etc., Mr. Fearnley says that the men making these statements must know that the majority of the men referred to are, with few exceptions, to all intents and purposes, pensioners on the department. The truth of the matter is that, in return for their payment to the union, the men expect to be given an annual dip into the pockets of the ratepayers. This much is revealed in a signed letter from a union man, published in a local journal, in which he states that to accept the present concession as final "would split the Association in Sheffield in two." He adds that only those who have been engaged in the building up of the branch know the hard work and sacrifices that have been made, and they simply cannot contemplate the possibility of all that work being thrown away.

## THE MOTOR TRAFFIC INQUIRY.

### Evidence from Liverpool and Manchester.

On July 18 the Chief Constables of Liverpool and Manchester were examined before the House of Commons Select Committee on power-driven traffic in London as to the traffic conditions prevailing in their respective cities.

Mr. F. Caldwell, M.V.O., Chief Constable of Liverpool, said the tramway system carried last year 134,249,967 passengers, and the mileage was 12,590,408. The number of tramcars each day in use was 8,434. The number of cars crossing busy street junctions was in one case 4,737, in another 4,667, and in several others about 3,500 per day. There were a number of very congested points where the light traffic crossed the heavy traffic, such as the approaches to the passenger landing-stages and the Riverside Station, etc. The traffic at all important street junctions was regulated by a constable. His power of regulation and control was derived from the Liverpool Improvement Act, sec. 273, which empowered the Lord Mayor to make traffic regulations, and permanent regulations were then made for all important points. Heavy slow traffic was kept to the left side of the road, leaving the middle of the road free for light fast traffic.

Tramcars were passed on the left or near side. The police were instructed to prosecute drivers of vehicles who passed too quickly past a tramway stopping place where passengers and a car were, and the question of speed was not so important as the circumstances of each class of traffic. In addition to the men on special traffic duty at fixed points, mounted police patrols were used in a number of the principal thoroughfares, as they were very useful in enforcing the rules of the road, preventing obstruction, and in streets where there was heavy horse-drawn traffic, in seeing that the proper space was kept between the carts to allow pedestrians to cross.

The number of accidents during the past year was:—Fatal, 27; injury only, 1,625; caused by horse-drawn vehicles, 12 and 632; tramcars, 7 and 519; motor cars, motor cycles, and other mechanically-propelled vehicles, 8 and 474. During the year 34 persons who had been knocked down or fallen in front of tramcars were pushed clear of the track by the plough lifeguards. He did not know of a case where the lifeguard failed. In the majority of cases the accidents were caused by carelessness on the part of the pedestrians.

By Mr. W. Thorne: There were only a few motor 'buses, and these were owned by the Corporation and used in the suburbs.

By Mr. Harris: A growing difficulty was dealing with a tramway stop and the passage of light vehicles, but there was no special by-law.

Mr. Kellaway: Your mortality rate for street accidents per 1,000 of the population is only 2.5. That is the best record except that for Bristol. There is this peculiarity, that in Liverpool there is a very complete system of electric tramways running in congested thoroughfares?—Practically the whole city is covered with tramlines, and we have no competing service of motor cars.

Do you regard the presence of electric tramways as rendering the control of traffic more difficult than it would be with any other form of traffic?—I personally look upon tramways as being a less dangerous form of traffic than a motor 'bus service.

### Chief Constable of Manchester.

Mr. R. Peacock, Chief Constable of Manchester, stated that the traffic problem was acute, and had been under the consideration of the authorities for many years. The difficulty of dealing with it was increased by the fact that there was no underground or overhead method of transit in the city. The total number of tramcars running daily was between 800 and 900, and during the busiest hours tramcars passed through some of the most congested thoroughfares at the rate of 66 per hour. The speed of the cars between certain points within the central area varied from 4.18 miles per hour to 5.96 miles per hour, while outside the central area it averaged about 10.71 miles. The low speeds at which the cars were run in the central portion tended to increase the congestion, and also greatly increased the cost of running. If the cars in the central area could be run at an average speed of eight miles an hour it was estimated that it would save between £20,000 and £30,000 per annum in the working expenses, and would tend to relieve the general congestion. Manchester had spent £2,365,669 in the last fourteen years in street improvements. The remedy for the congestion must be found in regulations enforceable by statutory authority.

A great contributory cause to the congestion was the growth of mechanically-propelled vehicles. Eight thousand motor vehicles had been registered. In recent years motor traction for the conveyance of merchandise had increased considerably. Section 1 of the Motor Car Act, if properly applied, was sufficient to deal with all cases of reckless or negligent driving. In 1911 there were 7 fatal accidents caused by horse-drawn vehicles, 3 by tramcars, 6 by motor cars, 8 by taxi cabs, and 7 by other mechanically-propelled vehicles. In 1912 the figures were:—Killed by horse-drawn vehicles 16 persons, by tramcars 7, by private motor cars 6, by taxi cabs 5, by other mechanically-propelled vehicles 4. The number of non-fatal accidents was as follows:—1911: By horse-drawn vehicles 358, by tramcars 317, by motor cars 231, by taxi cabs 154, by motor cycles 51, by other mechanically-propelled vehicles 57; total, 1,168. 1912: By horse-drawn vehicles 372, by tramcars 349, by private motor cars 123, by taxi cabs 163, by motor cycles 53, by other mechanically-propelled vehicles 36; total, 1,096.

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In 1902 the Corporation obtained powers to make regulations (a) prescribing the line to be kept at any street crossing by all persons riding or driving, and (b) requiring the drivers of heavy and slow-moving vehicles to keep their vehicles to a particular portion of the street. Regulations were made and duly put into force with beneficial results to the traffic, public safety, and convenience. A few years ago, however, an appeal against a conviction was made, and the Court quashed the conviction on the ground that no offence was committed unless a warning was given by a constable stationed in the street to direct the traffic. The effect of this ruling was to render the regulations inoperative, as only a small portion of the force was exclusively engaged in the direction of traffic.

The Committee adjourned indefinitely, the Chairman intimating that he would call them together when he had prepared a draft report.

## TRAMWAY LABOUR TROUBLES.

THE STRIKE AT EDINBURGH.

At the height of its tourist and holiday season, Edinburgh has this week been deprived of its cable car service by a strike of tramwaymen, who, to the number of 680, ceased work on Friday night, July 18. The men asked for an increase of a halfpenny per hour, and the company offered a farthing per hour increase, which was refused. The men point to the large dividends now earned by the company (last year the dividend was 40 per cent.), and, looking to the increased cost of living, claim that they are entitled to a larger share of the profits.

On the other hand, the directors of the company state that for fourteen years prior to 1908 they were not able to pay dividends, and that the shareholders were entitled to set that fact against the large dividends earned now. The company have imported about fifty "spare" drivers from the Manchester district, and about ninety of the old hands returned during the week. These men, however, have had no experience of the cable car system, and they have undergone training in the Shrubhill depôt during the week, under the direction of Mr. Harris, the engineer. On Tuesday three cars were run out, having on board Mr. C. W. Shepherd, the general manager, and about 30 of the Manchester men. All three were in charge of experienced drivers, and the first car was cheered by the crowd outside the Shrubhill depôt.

A meeting of the Edinburgh magistrates was held on Tuesday, at which it was intimated that applications were to be made for licences for the new drivers and conductors. It was agreed to hear the applications on Friday. Hitherto 21 days' training has been insisted on before granting the licences.

The Amalgamated Association of Tramway and Vehicle Workers of which Alderman Jackson, of Manchester, is secretary, sent a letter to the local committee in which he said that if the men lost their heads and declared a strike, the best advice he could give to the union members was to remain at work. The local secretary followed the advice of Alderman Jackson. The directors of the company have complained that the deputation of the men who twice met them and the manager agreed to recommend the employees to accept the board's offer; yet they are now the leaders of the strike. How is it possible, the directors ask, to negotiate with men who sign an agreement one day and strike the next?

A partial service was instituted on the Post Office and Nether Liberton route on July 23, by four cars, each carrying four constables. Yesterday 28 cars were running. The Lord Provost has agreed to write to both parties suggesting the holding of a conference, with himself as chairman.

STRIKE BALLOT AT SHEFFIELD.

The Sheffield Tramways Committee at a special meeting on July 22, refused to grant further concessions to their employees, and thus comply with the application of the men for pay at the rate of time and a half for all Sunday labour. The Committee had already decided to grant the request in respect to motormen and conductors with over five years' service, and that the shilling a week merit pay at present given to car cleaners of ten years' service be extended to night shed men and other mechanicians of ten years' approved service. The Committee are also prepared to refer the question in dispute to the arbitration of some independent person, to be appointed by the Board of Trade. The union officials, who claim that 97 per cent. of the men are organised, state that a ballot will be taken as soon as possible on the question of ceasing work.

The publication of the Tramways Committee's resolution was accompanied by the appearance in the local papers of a two-column letter which Mr. A. R. Fearnley, the general manager, had been instructed to forward to the union secretary. Appended are some extracts from the document:—

"The Committee are not prepared to admit the principle that the same rate of pay should be given to men who have only been in the employ of the department for a comparatively short period as to those who have had a more lengthened service.

"The following table shows the wages paid per car mile run on sixteen of the principal municipal tramways in the country:—

| | | | |
|---|---|---|---|
| West Ham ... ... ... | 2.597d. | Sunderland ... ... ... | 2.137d. |
| Sheffield ... ... ... | 2.347d. | Birkenhead ... ... ... | 2.113d. |
| London County Council ... | 2.199d. | Leeds ... ... ... ... | 2.113d. |
| Newcastle-on-Tyne ... ... | 2.183d. | Nottingham ... ... ... | 2.11d. |
| Halifax ... ... ... | 2.166d. | Bradford ... ... ... | 2.045d. |
| Glasgow ... ... ... | 2.163d. | Manchester ... ... ... | 2.040d. |
| Leicester ... .. ... | 2.150d. | Rotherham ... ... ... | 1.987d. |
| Liverpool ... ... ... | 2.138d. | Hull ... ... ... ... | 1.93d. |

"The difference between the Sheffield and the London County Council figures on the Sheffield mileage means increased wages in favour of the Sheffield motormen and conductors to the amount of £4,977 4s. 7d. per annum. Ditto Halifax, which is the next highest Yorkshire town to Sheffield, £6,087 0s. 5d.; ditto Leeds, £7,869 8s. 1d.; ditto Bradford, £10,156 4s. 10d.; ditto Hull, £14,023 13s. 9d. The only reason why the West Ham figure is above that of Sheffield is on account of their paying the conductors at the same rate of pay as the motormen."

MEN TO VOTE ON THE PROPOSAL TO ARBITRATE.

The committee of the men's union on July 24 published a reply to the general manager's letter, the communication concluding as follows:—"The question of arbitration opens up an entirely new situation. We have submitted our case to the committee, and believe we have established our claim, and if the committee, on their part, can leave their case in the hands of an independent chairman, well, then the men have the same faith. The men must decide this question for themselves, and the first opportunity will be taken to place the matter before them. The committee realise that the onus of a quarrel is now placed upon the men and to refuse arbitration would prejudice their case in the eyes of the public. The committee have recommended that the men be approached at once, and their opinion taken, and future actions will be determined by the result of the meetings."

## THE RATING OF TRAMWAYS.

JUDGMENT BY THE HOUSE OF LORDS.

The House of Lords on Thursday gave the important decision that tramways in England are liable to pay rates on the whole of their annual value and not on one-fourth as is the case with railways. This decision was arrived at in the well-known case of the Urban District Council of Tottenham *v.* the Metropolitan Electric Tramways, Limited, and it involved reversing the finding of the Court of Appeal and restoring that of the Divisional Court.

No difficulty arose on the facts of the case. The electric tramway company are owners or lessees of tramways and light railways in Middlesex. Tottenham District Council in 1910 for the purposes of the general district rate assessed on the full net annual value tramways of the company in Tottenham. Contending that their lines in fact constituted a railway and as such were (under the Public Health Act) only liable to be assessed in the proportion of one-fourth of their net annual value, the company paid only £123 18s. 2d., or a quarter of £495 12s. 6d., the sum demanded by the rating authority. On the matter being referred to the Courts as a test case, the Divisional Court held that the tramways should pay on their full annual value, but the Court of Appeal reversing that decision held that these tramways should only pay on one-fourth. The House of Lords restored the judgment of the Divisional Court.

In the system of the Metropolitan Electric Tramways, Limited, in Tottenham, a part of the lines was described as "tramways" (having been authorised as such) and another as "light railways" (having been authorised by Light Railway Order). The judges in the Court of Appeal stated that, so far as physical construction and appearance went, the light railways and the tramways were identical. Carriages used on tramways ran through, and over the light railways, and the electrical propelling energy was derived from a common scource. The Tottenham District Council urged that the tram lines were not "land used only as a railway" within the meaning of Section 211 of the Public Health Act, 1875. The light railways are rated on only one-fourth of their net annual value in accordance with the decision of the House of Lords in the Wakefield case.

The LORD CHANCELLOR, in moving on Thursday that the appeal should be allowed and the finding of the Divisional Court restored, said that both he and Lord Shaw agreed with the judgment which Lord Moulton would deliver.

Lord MOULTON then read an exhaustive judgment in the course of which he said that when tramways were started they were in the hands of private companies, and the Legislature was not disposed to treat them too liberally. On the other hand, under the Light Railways Act, 1896, the Legislature gave many advantages as an inducement to promoters. It seemed to him that light railways, running, as they did in many cases, over land owned by the promoters, could get but very small advantage from municipal expenditure of the rates, such, for instance, as the lighting and sewering of roads, and therefore were justly entitled to contribute to the rates at one-fourth of their assessment. But that was not the case with a tramway running along main streets, for the pavements might in a sense be said to be the platforms for the use of their passengers, and they got full advantage of the lighting and general expenditure on the streets paid for by the rates. He thought the distinction between a light railway and a tramway or tram road was clearly understood, both by the popular and the legal acceptation of the two terms respectively, and that if the partial exemption from rates conferred on light railways by the Public Health Act, 1875, was intended to extend to tramways the Act would have made it clear in terms. In the present case the subject of taxation was not a railway but a tramway, constructed under Acts which were specifically Tramway Acts, and subject to the privileges and disabilities given to tramways by the public legislation relating to them. There remained only one head of argument, standing entirely by itself, which must be noticed, and which at first appeared to possess great weight. The Tramways Act, 1870, applied to Scotland. The cases quoted on behalf of the respondents showed that tramways in Scotland were valued by

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a functionary known as the railway and canal assessor, a fact which at first sight would appear to show that in Scotland tramways possessed the legal status of railways and were treated as such. If this were the case, it would give great weight to the contention that they ought to be so treated in England, and to enjoy the exemption as to rating granted to railways. But when the matter was looked into more closely, it assumed a very different appearance. The rateability of the tramways in Scotland was established by a decision which rested not upon their being railways, but—as in England—upon their being in occupation of land. It was true that, in consequence of that decision, tramways came to be valued by the railway and canal assessor, but this did not imply that they were recognised as having the legal status of railways, because the functions of the railway and canal assessor were not confined to valuing railways and canals. He could be called upon to value waterworks, gasworks, and any other concerns which traversed more local units than one; and, seeing that he had such special experience, he evidently was the most suitable person to value such a subject as the continuous route of a tramway. But the matter in Scotland was put in a position still more widely different to that in which it stood in England by the Burgh Police (Scotland) Act, 1892, which, by Section 147, expressly provided that railways and tramways *eo nomine* should be entitled to a three-quarters reduction. This did not apply to counties where both railways and tramways were rated at their full value, nor did it apply to parishes where there was a power of classification of property. Inasmuch as the Act did not apply to England, it was immaterial to the decision of the present case. For all these reasons he was of opinion that in public legislation the word "railway" did not include tramways unless it was expressly made so to do by the terms of the Act. To hold otherwise would be to put tramways under the exclusive jurisdiction of the Railway and Canal Commissioners—a thing which had never been suggested during the forty years of the existence of that Court, and was obviously contrary to the intentions of the Legislature in creating it. The word "tramway" had had both popularly and legally a distinct meaning for the last 40 years, and although the action of the Light Railway Commissioners might have produced some confusion and had certainly led to the exemption being obtained in cases in which it was not merited, this could not affect a case like the present, where the subject of taxation was neither legally nor popularly a railway. He was therefore of opinion that the judgment of the Divisional Court should be restored and the respondents should pay to the appellants their costs here and below.

## L.C.C. TRAMWAY MATTERS.

NEW LINE AT FOREST HILL.

At last Tuesday's meeting of the London County Council the Highways Committee reported that the street widenings along the route of the authorised tramways from London Road to Park Road, Forest Hill, would probably be completed towards the end of this year, and the Committee considered that arrangements should be made for the construction of the lines. These would connect existing tramways and enable through car services to be run between Dulwich and New Cross and Rushey Green. The estimate of cost for construction on the conduit system, including trackwork, lowering of the roadway under a railway, rails, and electrical equipment, was £16,050. Approval was asked for the necessary estimates.

GREENWICH POWER STATION EXTENSION.

In regard to the question of the construction of foundations for the first two turbo-generators to be installed in Greenwich power station, the alterations to give increased capacity to the coal bunkers and ash hoppers, and the provision of additional workshops, etc., the Committee reported that the first turbine foundation would require to be completed by the end of the present year. Before this work could be commenced it would be necessary to demolish the foundation of one of the reciprocating engines. The Committee proposed that the foundation work should be carried out as a separate contract on the basis of a schedule of prices as this would enable a contract to be placed at an early date, and approval was asked of an approximate estimate of £6,500 for this work, and it was proposed that tenders should be invited from selected firms.

These reports stood over for a week.

CENTRAL CAR REPAIR DEPOT.

The Committee recommended that tenders be invited from selected firms for the erection of part of the third section of the central car repair depôt.

TRAVELLING CRANE FOR GREENWICH STATION.

The following tenders were received for the supply of a fifty-ton overhead travelling crane for Greenwich generating station :—

| | |
|---|---|
| Babcock and Wilcox ... ... ... ... | £2,285 0 0 |
| Cowans Sheldon and Co. ... ... ... ... | 2,809 10 0 |
| Joseph Booth and Bros. ... ... ... ... | 2,970 0 0 |
| Carrick and Ritchie ... ... ... ... ... | 2,989 0 0 |
| S. H. Heywood and Co. ... ... ... ... | 3,392 10 0 |

The estimate of the chief officer was £2,200. The Committee proposed that the tender of Babcock and Wilcox should be accepted, and that that firm be allowed to sublet as under :—(1) General Electrical Company and British Westinghouse Company, electrical equipment; (2) Lanarkshire Steel Company, or the Steel Company of Scotland, steel sections; (3) Stewarts and Lloyds, cast steel.

THE LONDON UNITED PURCHASE.

In regard to the arbitrator's award in connection with the purchase by the Council of the portion in London of the undertaking of the London United Tramways, the Committee recalled the fact that there were several points on which the Council had given notice of appeal, and the company were also appealing on other points. The Committee were at present in negotiation with the company with regard to the working of the tramways after purchase, and they had accordingly made arrangements that all litigation on the matters in dispute should be postponed for the present pending an agreement being arrived at as to the working of the lines. If a satisfactory agreement was come to it might not be necessary to proceed with the litigation.

Following up a policy already acted on, the Committee proposed that the Council should now take steps to carry out necessary repairs on further portions of the London United Tramways about to be taken over by the Council. The tracks proposed to be dealt with were in Goldhawk Road and King Street, and on the Hammersmith loop. The cost of the work was estimated at £10,700, and it was proposed that it should be proceeded with at once. The company would be prepared to carry out the work on the lines agreed to as regarded the parts of the track work last reconstructed. The Finance Committee reported that the expenditure should be regarded as incidental to the cost of the purchase of the part of the undertaking in London. The total amount expended, or to be expended on the reconstruction of nearly eight miles single track was £51,800. This comprised all but about two miles of the lines to be purchased.

These reports were adopted.

## MISCELLANEOUS NEWS AND NOTES.

**Electrification of Morecambe Tramways.**—The Tramways Committee have instructed the borough electrical engineer, Mr. L. B. Hogarth, to prepare an estimate for the electrification of the horse tramways.

**Tramways Extension at Swansea.**—After holding a local inquiry the Light Railway Commissioners have granted an Order for the construction of tramways on Town Hill as recommended in a scheme prepared for the Town Council by Mr. Stephen Sellon. The object of the proposal is to develop Corporation lands for the provision of workmen's and other dwellings. The working of the railways on the gradients involved will be subject to approval by the Board of Trade.

**Liverpool Corporation Tramways** have obtained from the National Steam Car Company, Limited, of Moulsham Works, Chelmsford, a new steam chassis of the maker's standard 32 h.p. type. Leaving London at five o'clock on Wednesday morning, the chassis travelled to Liverpool under its own steam, arriving at seven o'clock in the evening of the same day, after covering a distance of 210 miles. Mr. Clarkson accompanied the chassis. A motor 'bus body will be erected on this chassis at the Lambeth Road Car Works of the Liverpool Corporation.

**Proposed Strike in the Ashton District.**—A strike ballot was taken on July 23 of the employees of Ashton Corporation Tramways, Stalybridge, Hyde, Dukinfield, and Mossley Joint Tramways Board, and Oldham, Ashton and Hyde Tramways Company, on the question of enforcing their demands for increased wages and extended holidays. It is announced that 96½ per cent. of the members of the union had voted in favour of a strike, and that the other 3½ per cent. were either against it or did not vote. The next step will be to get the sanction of the general executive to proceed with the strike, in the event of the demands of the men not being conceded.

**Success of the P.A.Y.E. Cars at Aberdeen.**—Mr. R. S. Pilcher, general manager of the Aberdeen Tramways, in his annual report issued on July 22, stated: "On April 28, 1913, the Council inaugurated the "pay-as-you-enter" principle on the Woodside section. Six new cars were built, and four altered and made suitable for the operation of this system of fare collection. These cars have been in service for some time now, and the public have become accustomed to them. We find that there is no congestion or delay through the prepayment of fares. The passengers have accomodated themselves to the system, and have their fares ready, whilst there have been no rear platform accidents. The receipts have gone steadily up, and although there is a natural increase taking place on this route, there is a large part of the increase in receipts due to the prepayment of fares. It is well known that under the usual method of collecting fares there is a considerable leakage, due mainly to the inability of the conductor to attend to his numerous duties and to collect all the fares." The year under review has been the most successful in the history of the undertaking.

## CONTRACTS AND ORDERS.

**Siemens-Schuckert, Limited,** have obtained a contract for the electrification of the Necochia (Argentina) tramways.

**East Ham Council** have accepted the tender of Callender's Cable and Construction Company, at £55 10s., for the supply of a feeder pillar.

**Croydon Council** have accepted the tender of Le Grand and Sutcliffe, of London, for a deep-well pump for the electricity works, at £435.

**Walthamstow Council** have placed a contract with the Blasberg Engineering Company for the erection of a natural draught cooling tower at the generating station, at £980.

**Ramsbottom Traction Committee** have recommended the Council to accept the tender of the Lancashire Electric Power Company for a switchboard at the electricity works.

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**The Titan Trackwork Company, Limited,** have secured contracts from the Merthyr Tydfil tramways, the Birkenhead Corporation tramways, and the Pelotas Electric tramways.

**Keighley Council** have placed a contract with the Cedes Electric Traction Company, Limited, for a spare pair of hind wheels, with armatures complete, and a spare current collector and flexible wire to the disconnecting socket, for the railless trolley vehicles, at £123 10s.

**London County Council** have accepted the following tenders:—Electric Construction Company, charging apparatus for electrically-driven fire appliances at Hammersmith fire station, £158; Babcock and Wilcox, fifty-ton overhead travelling crane for Greenwich power station, £2,285; Burt, Bolton and Haywood, 50,000 creosoted deal paving blocks required in connection with the diversion of tramway tracks in Wood Lane, delivered by van on the site, £7 6s. 10d. per thousand, total £367 1s. 8d. The Highways Committee have reported, without mentioning the names of the firms, that they have arranged for the purchase of 100 cast steel wheel centres at the cost of £216 18s. 9d., and 1,000 plough leads and 3,500 sliding contact plough leads, at a cost of £518 15s.

## PERSONAL.

**Mr. J. R. Taylor,** chief clerk in the Ashton tramways department, has been recommended for an increase of £13 per annum in his salary.

**Mr. R. H. Schofield,** who has been appointed sales manager to Ferranti, Limited, Central House, Kingsway, W.C., has been with the Ferranti Company nearly twenty years.

**Mr. L. C. F. Bellamy,** manager of Ilkeston Corporation tramways and borough electrical engineer, was married on Wednesday to Miss Eileen Leghorn at St. John's Church, Fairfield, Liverpool.

**Inspector J. Pearson,** of Glasgow Corporation tramways, has been presented with the St. Andrew's Ambulance Association certificate of honour for bravery in stopping a runaway horse. But for his action some of the passers-by must have been injured.

**Sir J. S. Harmood Banner,** M.P., Lord Mayor of Liverpool, who was knighted on the occasion of the King's visit, is a director of the British Insulated and Helsby Cables, Limited, the Midland Electric Corporation for Power Distribution, Limited, etc.

**Mr. George Webster,** the new manager of the Rochdale tramways, joined the staff of the old Rochdale Tramways Company and rose to the position of traffic superintendent. In 1904, when the undertaking was taken over by the Corporation, Mr. Webster was appointed traffic superintendent.

**Aberdare Tramways Appointments.**—The following members of the electricity staff have been appointed to positions in the electricity and tramways department:—Mr. W. J. Williams, as works superintendent; Mr. W. T. Hilder, as outside superintendent; and Mr. G. D. Morgan, as chief clerk.

**Mr. Alfred Clough,** resident electrical engineer to the Liverpool Tramways and Electric Power and Lighting Committee, acting under medical advice has intimated his desire to retire from the service. The resignation has been accepted as and from October 1 next, and the committee have placed on record their appreciation of the services rendered by Mr. Clough to the Corporation and to the community in connection with the management and development of the electric supply undertaking.

## FINANCIAL REPORTS AND MEETINGS.

**Millar's Timber and Trading Company.**—The directors recommend a dividend of 5 per cent. on the ordinary shares.

**Blackpool and Fleetwood Tramroad Company, Limited.**—The board have declared an interim dividend at the rate of 4 per cent. per annum.

**Lanarkshire Tramways Company.**—For the half-year ended June 30 last it is proposed to declare a dividend at the rate of 6 per cent. per annum, as against 5½ per cent. per annum for the corresponding period last year.

**Chatham and District Light Railways.**—The following dividends are recommended by the directors for the half-year ended June 30:—At the rate of 5 per cent. per annum on preference shares, and at the rate of 3 per cent. per annum on ordinary shares.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended July 18 amounted to £52,627. Upon such of the lines as were working both last year and this year the receipts show a decrease of £389 upon the week.

**Loss on the West Ham Tramways.**—The deficiency of £3,388 on the working of the West Ham tramways for the past year was discussed at the meeting of the Town Council on July 22. A proposal to support the Croydon Corporation in the demand that the Government be urged to pass legislation to place motor 'bus companies on terms of equality with municipal tramways with regard to public obligations was agreed to. The Tramways Committee were directed to report upon the desirability of obtaining powers to run omnibuses in the borough.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended July 19 amounted to £261,389, or £11,454 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £96 7s. 7d. per track mile, an increase of £2 8s. 5d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

July 25, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, July 25. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 66 7 6 | 63 17 6 | 78 17 6 |
| ,, (three months) .. .. | 65 12 6 | 63 12 6 | 78 17 6 |
| Electrolytic Copper—bars or ingots .. | 69 0 0 | 66 0 0 | 81 10 0 |
| Aluminium—bars or ingots .. .. .. | 89 0 0 | 89 0 0 | 76 10 0 |

## COAL MARKET.

July 25, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| London, free into barge in Thames— | Friday, July 25. s. d. | Last Week. s. d. | A Year Ago. s. d. | Two Years Ago. s. d. |
|---|---|---|---|---|
| Best Admiralty Welsh (large) | 25 6 | 25 6 | Quotations owing to transport workers strike. | 23 0 |
| Best Seconds .. .. .. | 24 0 | 24 0 | | 21 6 |
| Ordinary Drys .. .. | 21 0 | 21 0 | | 19 9 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | | 19 3 |
| Best Washed Peas .. .. | 19 6 | 19 6 | | 17 3 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 | 21 0 | 17 3 | 19 0 |
| Best Seconds .. .. | 19 6 | 19 6 | 16 6 | 17 6 |
| Ordinary Drys .. .. | 16 6 | 16 6 | 14 9 | 15 9 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 13 9 | 15 3 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 12 3 | 13 3 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 3 | 15 3 | 13 6 | 11 10½ |
| Best Seconds .. .. .. | 13 6 | 13 6 | 11 9 | 9 10½ |
| Smalls .. .. .. | 10 0 | 9 6 | 10 0 | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | July 22 | £46,772 | £52,809 | 29 | £1,617,148 | +£140,254 |
| Auckland..... (28 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,903 |
| Ballarat and Bendigo | June 8 | 917 | 802 | 10 | 9,593 | — 110 |
| Bombay .. .. Rs. | June 27 | 2,854 | 2,785 | 26 | 80,991 | + 3,559 |
| Brazilian St. Rly. Mlrs. | June | 40,854 | 48,882 | 47 | 496,129 | + 17,623 |
| Brazilian Traction..... | July 19 | 81,656 | 95,378 | 29 | 2,635,430 | + 378,635 |
| Brisbane ..... | June | 21,570 | 25,013 | 26 | 151,003 | + 43,349 |
| British Columbia ....$ | May | 491,826 | 566,128 | 47 | 6,269,123 | +1,017,780 |
| Buenos Aires Pt. & City | Feb. | 6,269 | 6,726 | 9 | 12,697 | — 1,100 |
| Buenos Aires Lacroze.. | June | 41,518 | 44,179 | 52 | 529,749 | + 43,906 |
| Calcutta.....Rs. | July 19 | 60,926 | 66,618 | 29 | 18,37,380 | + 67,535 |
| Cape Town ..... | April | 11,771 | 12,175 | 17 | 51,462 | + 3,148 |
| Carthagena & Herrerias | June | 1,671 | 2,158 | 26 | 17,331 | + 6,498 |
| East India ..... | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie..... | June | 3,351 | 2,854 | 26 | 17,226 | — 1,431 |
| La Plata..... | June | 3,557 | 4,846 | 26 | 31,571 | + 6,822 |
| Lima..... | June | 32,175 | 31,200 | 26 | 198,227 | + 8,110 |
| Lisbon ..... Mlrs. | Jan. | ... | 147,848 | 4 | 147,848 | ... |
| Madras (28 days) Rs. | July 15 | 25,218 | 28,429 | 28 | 347,657 | + 25,781 |
| Melbourne ..... | May | ... | 62,000 | 21⅓ | 324,000 | ... |
| Mexico .....$ | June | 558,355 | 588,790 | 26 | 3,265,540 | — 5,881 |
| Montevideo..... | June | 26,392 | 28,820 | 34 | 258,427 | + 20,005 |
| Para ..... | July 20 | 4,011 | 3,817 | 33 | 134,768 | + 3,068 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | April | 3,420 | 4,357 | 17 | 16,988 | + 1,312 |
| Shanghai .....$ | June 16 | 20,690 | 23,200 | 28 | 582,052 | + 46,220 |
| Singapore .....$ | July 19 | 10,212 | 12,454 | 29 | 338,797 | + 36,929 |
| Toronto .....$ | May | 693,015 | 811,872 | 21 | 3,840,280 | + 524,541 |
| Winnipeg.....$ | May | 298,748 | 316,827 | 21 | 1,651,336 | + 143,086 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London..... | July 19 | £4,192 | £4,528 | 29 | £147,056 | +£13,466 |
| City and South London | ,, 19 | 2,825 | 2,818 | 29 | 82,523 | — 7,798 |
| Liverpool Overhead..... | ,, 20 | 1,710 | 1,858 | 29 | 48,831 | + 3,773 |
| London Electric..... | ,, 19 | 12,335 | 13,090 | 29 | 409,325 | + 4,965 |
| Mersey ..... | ,, 19 | 2,015 | 2,306 | 29 | 65,003 | + 4,500 |
| Metropolitan ..... | ,, 20 | 17,066 | 17,175 | 29 | 487,914 | + 3,594 |
| Metropolitan District.. | ,, 19 | 12,102 | 12,734 | 29 | 381,954 | + 15,338 |

DICK, KERR & CO.,
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LONDON, E.C.
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Complete Equipment
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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregates. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | July 16 | £1,805 | £1,699 | — £106 | 7 | £10,885 | + £197 |
| Ayr Corporation ..... | ,, 19 | 1,130 | 578 | — 552 | 9 | 3,659 | — 498 |
| Bath Electric ..... | ,, 16 | 1,105 | 1,286 | + 181 | 29 | 25,921 | + 879 |
| Birmingham Corp. ..... | ,, 19 | 10,824 | 11,583 | + 758 | 16 | 183,489 | + 12,904 |
| Blackburn Corporation | ,, 16 | 1,345 | 1,638 | + 293 | 16 | 21,212 | + 1,522 |
| Blackpool & Fleetwood | ,, 19 | 1,268 | 1,282 | + 14 | 3 | 3,981 | — 16 |
| Blackpool Corporation | ,, 17 | 2,497 | 2,528 | + 31 | 15 | 24,810 | + 1,505 |
| Bolton Corporation ..... | ,, 20 | 2,684 | 2,830 | + 146 | 16 | 43,666 | + 1,941 |
| Bournemouth Corp..... | ,, 23 | 2,002 | 2,292 | + 290 | 16 | 33,079 | + 2,759 |
| Bradford Corporation... | ,, 19 | 6,011 | 6,224 | + 213 | 16 | 95,088 | + 3,935 |
| Brighton Corporation... | ,, 20 | 1,183 | 1,181 | — 2 | 16 | 16,647 | — 7 |
| Bristol ..... | ,, 18 | 7,804 | 9,344 | + 1,540 | 28 | 221,290 | + 28,510 |
| British Elec. Traction— | | | | | | | |
| Airdrie..... | July 18 | 345 | 389 | + 44 | 29 | 9,627 | + 1,268 |
| Barnsley ..... | ,, 18 | 195 | 369 | + 174 | 29 | 7,523 | + 2,665 |
| Barrow ..... | ,, 18 | 527 | 482 | — 45 | 29 | 11,107 | + 570 |
| Birmg.& Mid. Joint— | | | | | | | |
| Birmingham Dist. ... | July 18 | 1,018 | 989 | — 29 | 29 | 28,961 | + 1,313 |
| Dudley—Stourbridge | ,, 18 | 1,011 | 1,100 | + 89 | 29 | 26,481 | + 2,232 |
| South Staffordshire... | ,, 18 | 1,008 | 958 | — 50 | 29 | 28,481 | + 2,095 |
| Wolverhampton Dist. | ,, 18 | 516 | 505 | — 11 | 29 | 14,662 | + 1,053 |
| Devonport ..... | ,, 18 | 570 | 624 | + 54 | 29 | 15,410 | + 113 |
| Gateshead ..... | ,, 18 | 1,122 | 1,581 | + 459 | 29 | 34,756 | + 5,578 |
| Gravesend & N'thfleet | ,, 18 | 214 | 268 | + 54 | 29 | 6,498 | + 707 |
| Greenock—P.Gl'gow | ,, 18 | 983 | 879 | — 104 | 29 | 23,852 | + 1,323 |
| Jarrow ..... | ,, 18 | 151 | 171 | + 20 | 29 | 4,075 | + 225 |
| Kidderminster ..... | ,, 18 | 169 | 153 | — 16 | 29 | 3,304 | + 78 |
| Merthyr ..... | ,, 18 | 325 | 337 | + 12 | 29 | 6,198 | + 687 |
| Metropolitan ..... | ,, 18 | 9,714 | 9,668 | — 46 | 29 | 237,644 | + 5,092 |
| Middleton ..... | ,, 18 | 439 | 446 | + 7 | 29 | 9,992 | + 523 |
| Oldham—Ashton..... | ,, 18 | 682 | 734 | + 52 | 29 | 17,662 | + 302 |
| Peterborough ..... | ,, 18 | 155 | 232 | + 77 | 29 | 4,796 | + 958 |
| Potteries ..... | ,, 18 | 2,153 | 2,077 | — 76 | 29 | 60,052 | + 7,074 |
| Rothesay ..... | ,, 18 | 1,158 | 472 | — 681 | 29 | 5,030 | — 210 |
| Sheerness ..... | ,, 18 | 62 | 72 | + 10 | 29 | 1,459 | + 98 |
| South Metropolitan... | ,, 18 | 955 | 883 | — 72 | 29 | 23,541 | + 480 |
| Southport ..... | ,, 18 | 386 | 377 | — 9 | 29 | 8,734 | + 494 |
| Swansea ..... | ,, 14 | 1,253 | 1,376 | + 123 | 29 | 35,366 | + 3,548 |
| Taunton ..... | ,, 18 | 50 | 54 | + 4 | 29 | 1,340 | + 100 |
| Tynemouth..... | ,, 18 | 406 | 391 | — 15 | 29 | 6,825 | + 543 |
| Weston-super-Mare ... | ,, 18 | 400 | 395 | — 5 | 29 | 8,484 | + 488 |
| Worcester ..... | ,, 18 | 357 | 405 | + 48 | 29 | 8,536 | + 483 |
| Wrexham & District.. | ,, 18 | 124 | 136 | + 12 | 29 | 3,427 | + 312 |
| Yorks (Woollen) Dist. | ,, 18 | 1,182 | 1,227 | + 45 | 29 | 32,855 | + 2,258 |
| Burnley Corporation ... | ,, 19 | 1,501 | 1,651 | + 150 | 16 | 28,412 | + 2,720 |
| Burton-on-Trent Corp. | ,, 20 | 303 | 280 | — 23 | 16 | 4,518 | + 96 |
| Bury Corporation..... | ,, 20 | 1,327 | 1,390 | + 63 | 17 | 21,926 | + 425 |
| Cardiff Corporation..... | ,, 12 | 2,573 | 2,921 | + 348 | 14 | 37,145 | + 3,876 |
| Chatham and District.. | ,, 17 | 981 | 1,055 | + 74 | 28 | 25,177 | + 1,194 |
| Chesterfield Corp. ..... | ,, 17 | 285 | 253 | — 32 | 15 | 3,893 | + 451 |
| Colne & Trawden..... | ,, 19 | 300 | 299 | — 1 | 29 | 7,689 | + 483 |
| Cork Electric..... | ,, 17 | 596 | 595 | — 1 | 28 | 13,759 | — 116 |
| Croydon Corporation ... | ,, 4 | 1,870 | 1,830 | — 40 | 13 | 22,949 | — 3,307 |
| Darlington Corporation | ,, 19 | 237 | 252 | + 15 | 16 | 3 959 | + 362 |
| Derby Corporation ..... | ,, 19 | 995 | 1,008 | + 13 | 16 | 15,624 | + 1,847 |
| Dover Corporation ..... | ,, 19 | 292 | 280 | — 12 | 16 | 3,778 | — 168 |
| Dublin & Lucan ..... | ,, 18 | 186 | 173 | — 13 | 2 | 433 | — 5 |
| Dublin United ..... | ,, 18 | 7,010 | 6,223 | — 787 | 28 | 168,146 | + 2,087 |
| Dundee City ..... | ,, 16 | 1,287 | 1,294 | + 7 | 9 | 11,837 | + 848 |
| East Ham Corporation | ,, 19 | 1,107 | 961 | — 146 | 16 | 16,684 | — 227 |
| Exeter Corporation ..... | ,, 18 | 373 | 372 | — 1 | 16 | 5,390 | + 87 |
| Glasgow Corporation ... | ,, 19 | 15,007 | 19,676 | + 4,669 | 7 | 143,941 | + 11,747 |
| Glossop(U. Elec.Supply) | ,, 19 | 138 | 128 | — 10 | 29 | 3,690 | + 457 |
| Halifax Corporation ... | ,, 15 | 2,712 | 2,211 | — 501 | 15 | 32,442 | — 746 |
| Hastings & District..... | ,, 17 | 1,232 | 1,296 | + 63 | 29 | 26,803 | + 1,237 |
| Huddersfield Corp. ..... | ,, 19 | 2,043 | 2,169 | + 126 | 16 | 34,006 | + 1,736 |
| Hull Corporation ..... | ,, 19 | 2,938 | 3,032 | + 94 | 16 | 48,591 | + 2,676 |
| Ilford U.D.C. ..... | ,, 19 | 563 | 457 | — 106 | 16 | 7,360 | — 1,303 |
| Ilkeston Corporation ... | ,, 23 | 134 | 133 | + 9 | 17 | 2,177 | + 455 |
| Ipswich Corporation .. | ,, 19 | 536 | 520 | — 16 | 16 | 7,206 | + 2 |
| Isle of Thanet (..... | ,, 19 | 1,313 | 1,283 | — 30 | 43 | 19,941 | + 463 |
| Kilmarnock Corp. ..... | ,, 19 | 186 | 179 | — 7 | 9 | 1,667 | + 78 |
| Lanarkshire ..... | ,, 17 | 1,875 | 1,714 | — 161 | 28 | 46,630 | + 5,888 |
| Lancashire United ..... | ,, 16 | 1,548 | 1,723 | + 175 | 28 | 41,645 | + 3,969 |
| Leeds City ..... | ,, 19 | 8,293 | 8,519 | + 226 | 16 | 132,384 | + 7,962 |
| Leicester Corporation... | ,, 19 | 2,756 | 2,893 | + 137 | 29 | 79,852 | + 7,598 |
| Leith Corporation ..... | ,, 19 | 887 | 786 | — 101 | 9 | 7,043 | + 127 |
| Liverpool Corporation.. | ,, 19 | 12,847 | 14,650 | + 1,803 | 28 | 363,160 | + 25,539 |
| Llandudno &Colwyn B. | ,, 18 | 541 | 556 | + 15 | 33 | 8,463 | + 810 |
| London County Council | ,, 16 | 44,213 | 42,745 | — 1,468 | 15 | 648,338 | — 23,078 |
| London Gnl. Omnibus.. | ,, 19 | 69,570 | 66,505 | + 6,935 | 29 | 1,780,681 | + 887,996 |
| London United ..... | ,, 18 | 7,493 | 7,189 | — 304 | 29 | 176,924 | — 2,334 |
| Lowestoft Corporation | ,, 5 | 210 | 219 | + 9 | 39 | 6,606 | + 358 |
| Maidstone Corporation | ,, 17 | 247 | 213 | — 34 | 16 | 3,186 | + 138 |
| Manchester Corp..... .. | ,, 19 | 17,351 | 19,750 | + 2,399 | 16 | 282,245 | + 13,254 |
| Nelson Corporation..... | ,, 19 | 210 | 208 | — 2 | 16 | 3,316 | + 90 |
| N'castle-on-Tyne Corp. | ,, 19 | 4,398 | 4,812 | + 414 | 16 | 76,853 | + 6,090 |
| Newport (Mon.) Corp.... | ,, 19 | 766 | 780 | + 14 | 16 | 11,828 | + 701 |
| New St. Helens & Dist... | ,, 16 | 915 | 1,061 | + 146 | 3 | 2,313 | + 307 |
| Northampton Corp ..... | ,, 18 | 627 | 646 | + 19 | 15 | 9,109 | + 219 |
| Nottingham Corp. ..... | ,, 17 | 3,389 | 3,365 | — 24 | 15½ | 51,818 | + 1,479 |
| Oldham Corporation ... | ,, 20 | 2,155 | 2,356 | + 201 | 17 | 37,051 | + 1,775 |
| Portsmouth Corp. ..... | ,, 19 | 2,515 | 2,587 | + 72 | 16 | 35,302 | — 500 |
| Preston Corporation ... | ,, 16 | 865 | 837 | — 28 | 16 | 14,151 | + 1,091 |
| Provincial ... ... ..... | ,, 19 | 2,172 | 2,349 | + 177 | 42 | 73,764 | + 3,749 |
| Reading Corporation ... | ,, 10 | 714 | 702 | — 12 | 14 | 9,839 | + 457 |
| Rochdale Corporation | ,, 19 | 1,727 | 1,686 | — 41 | 16 | 25,563 | + 393 |
| Rotherham Corp. ..... | ,, 23 | 737 | 989 | + 252 | 16 | 15,702 | + 4,036 |
| Salford Corporation ... | ,, 21 | 4,951 | 5,247 | + 296 | 16 | 84,763 | + 2,113 |
| Sheffield Corporation... | ,, 20 | 6,669 | 7,367 | + 698 | 17 | 123,257 | + 12,193 |
| Southampton Corp. ... | ,, 16 | 1,444 | 1,423 | — 21 | 15 | 19,872 | + 374 |
| Southend-on-Sea Corp. | ,, 16 | 1,079 | 1,151 | + 72 | 16 | 13,503 | + 1,372 |
| South Shields Corp..... | ,, 19 | 685 | 806 | + 121 | 15 | 11,314 | + 1,421 |
| Sunderland Corp. ..... | ,, 20 | 1,362 | 1,598 | + 226 | 16 | 22,710 | + 2,274 |
| Sunderland District ... | ,, 16 | 526 | 568 | + 42 | 37 | 19,741 | + 3,640 |
| Swindon Corporation... | ,, 16 | 149 | 132 | — 17 | 15 | 2,477 | + 176 |
| Trys.(M.E.T.)Omn. Co. | ,, 19 | ... | 6,663 | ... | 29 | 77,371 | ... |
| TynesideTrys.&Tmrds | ,, 16 | 556 | 562 | + 6 | 3 | 1,185 | — 52 |
| Wallasey Corporation | ,, 19 | 1,312 | 1,334 | + 22 | 16 | 19,509 | + 1,308 |
| Walsall Corporation ... | ,, 19 | 615 | 623 | + 8 | 29 | 17,643 | + 1,230 |
| Walthamstow U.D.C.... | ,, 19 | 887 | 749 | — 118 | 16 | 11,968 | — 769 |
| Warrington Corp ..... | ,, 17 | 506 | 423 | — 83 | 16 | 7,034 | + 299 |
| West Ham Corporation | ,, 17 | 2,780 | 2,854 | + 74 | 15 | 42,941 | + 890 |
| Wigan Corporation ... .. | ,, 17 | 1,365 | 1,518 | + 153 | 15 | 22,837 | + 2,510 |
| Wolverhampton Corp | ,, 23 | 1,011 | 1,149 | + 138 | 17 | 17,792 | + 854 |
| Yorkshire (W. Riding) | ,, 20 | 1,223 | 1,411 | + 187 | 29 | 41,002 | + 4,389 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, July 25. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 79 — 83 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¾ — 5 |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅞ — 4⅞ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 90½ — 92½ |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 94½ — 96½ |
| 100 | Do. 5% Deb. Stk. Red.... | + ½ | 96¼ — 98¼ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 99 —101 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅜ — ⅝ |
| 1 | Do. 5% Cum. Pref ..... | ... | ⅜ — ⅝ |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 72 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13¾ — 14¼ |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref .... | ... | 11 — 11¼ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 1 | 86 — 88 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 6¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5¼ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. ... | — ½ | 97 —100 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6 |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 7 — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —103 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 94 — 96 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | + 1 | 123 —128 |
| 100 | Do. Pref. Ord. Stock ..... | ... | 111 —116 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | + ½ | 102½ —105½ xd |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —102 xd |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | + ½ | 95½ — 97½ |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 78 — 81 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 38 — 41 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 8 — 10 |
| 100 | Do. Deferred Ord. Stock ..... | ... | 3½ — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock ..... | ... | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 73 — 77 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 92 — 96 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 98½ —100½ |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5⅝ — 6⅛ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅛ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ⅛ — ⅛ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¾ |
| 190 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5¼ — 5⅝ |
| 100 | Do. 4% Debenture Stock Red, 1965 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ½ | 93½ — 95½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅞ |
| 10 | Dublin United Trams. Co. (1898) Lim. Ord. ..... | ... | — 11¾ xd |
| 10 | Do. do. 6% Pref. ..... | ... | — 12¾ |
| 100 | Do. do. "A" Red. ..... | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79½ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8¼ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | ⅜ — ⅜ |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | ⅞ — ⅞ |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | ... | 94½ — 98½ xd |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 4 — 4½ |
| 10 | Do. do. 6% Cum. Pref..... | ... | 7 — 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2½ — 2¾ |
| 100 | Do. do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | ⅝ — ⅝ |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | ⅜ — ⅝ |
| 10 | Lanarkshire Tramways Co. ..... | .. | 1 — 1½ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. ..... | ... | 10 — 10½ |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 76 — 78 |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1⅜ — 1⅜ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 1 — 1¼ |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | 91 — 96 |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | + ½ | ⅝ — ⅝ |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 93 — 95 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | — 1 | 87 — 89 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 56 — 60 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 101 —103 |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 4¾ — 5⅛ |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | — 1 | 87½ — 90½ |
| $1,000 | Do. do. 5% Bds. ..... | ... | 107 —110 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 99 —101 |
| 100 | Metropolitan Elec. Trms. Ltd..4½% Deb Stock, Red. ... | ... | ⅛ — 1⅛ |
| 100 | Do. 5% Deb. Stock, Red. ... | ... | 84 — 88 |
| $100 | Mexico Tramways Co., Common Stock ..... | — ⅜ | 91½ — 94½ |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 2 | 86 — 89 xd |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | ... | 87 — 90 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | — 1 | 87 — 90 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 92 — 94 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 99 —101 |
| 1 | National Steam Car Co. Ltd ..... | — ⅛ | 98 —100 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 1 — 1⅛ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 6½ — 6¾ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6⅛ — 6⅜ |
| 5 | Do. do. 6% Cum. Pref. ..... | — ⅛ | 6 — 6⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord..... | ... | 4½ — 5 |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 1⅛ — 1⅜ |
| 1 | Do. 5% Cum. Pref. ..... | ... | ⅜ — ⅜ |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | ⅛ — ⅛ |
| 1 | Provincial Tramways, Lim., Ord. ..... | ... | 82 — 85 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | ⅞ — ⅞ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% ... | ... | 97½ —100½ |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. .... | ... | 84 — 87 |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 5 — 5½ |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 95 — 97 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | 85 — 87 |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | + ½ | — |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | ... | 97½ — 99½ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | 91½ — 93½ |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | — 1 | — |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 98 —100 |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 8¼ — 9¼ |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | 85 — 89 |
| 100 | Do. do. 4% Deb. Stk..... | ... | ⅝ — ¾ |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 63 — 68 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 96 — 98 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 98 —100 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 86 — 88 |
| 5 | United Elec. Tramways of Monte Video, Ord..... | ... | 89¾ — 92¾ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 4¾ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | + ½ | 4¾ — 5⅛ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 97 —100 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | 98½ —101½ |
| 5 | Do. do. 6% Cum. Pref..... | ... | ¼ — ¾ |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 3⅛ — 3⅜ |
| | | | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 6. ] LONDON, SATURDAY, AUGUST 2, 1913. [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### BOROUGH OF BRIGHOUSE.

ELECTRICITY DEPARTMENT.

The Electricity Committee invite tenders for the supply and delivery of 600 yards of .15 by .075 by .15 Lead Covered Cable; 300 yards of .15 by .075 by .15 Armoured Cable; 720 yards of .1 by .05 by .1 Armoured Cable; and 220 yards of .033 by .022 by .033 Armoured Cable; also 3 Feeder Pillars.

Copies of specifications may be obtained from the Electrical Engineer, Electricity Works, Huddersfield Road, Brighouse.

Tenders, endorsed "Cables" or "Feeder Pillars," as the case may be, to be delivered at my office not later than Saturday, August 9, 1913.

The Council do not bind themselves to accept the lowest or any tender.

JAS. H. ROTHWELL,
Town Clerk.

Municipal Offices, Brighouse,
July 28, 1913.

### GREAT NORTHERN RAILWAY COMPANY (IRELAND

The Directors are prepared to receive tenders for the supply of:—

Bull Head Rails,
Flat Bottom Rails,
Fishplates,
Cast Iron Chairs, and
Permanent Way Fastenings.

Specifications and forms of tender can be obtained from the Secretary.

Tenders, made out on the forms supplied by the Company, should be delivered, under sealed cover, endorsed "Tender for ———," to the undersigned not later than 10 a.m. on Monday, August 25, 1913.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street, Terminus, Dublin,
July 30, 1913.

### CITY OF TRURO.

Tenders are invited by the Corporation for the supply and delivery of about—

(a) 700 super yards Artificial Footway Paving.
(b) 6,000 Creosoted Deal Blocks.

Particulars and forms of tender can be obtained upon application to the undersigned, to whom sealed tenders, suitably endorsed, should be sent not later than noon on Monday, August 11, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

FREDK. A. BARNES,
City Engineer and Surveyor.

Municipal Buildings, Truro,
July 28, 1913.

### LIVERPOOL CORPORATION TRAMWAYS.

ADVERTISING ON TRAMWAY CARS.

The Tramways and Electric Power and Lighting Committee are prepared to receive tenders for the exclusive right to Advertise upon the Tramway Cars for a period of seven years, commencing on the 1st August, 1914.

The number of cars, working and spare, excluding first-class cars, is 496, and the total length of line traversed 119 miles. The total mileage of the cars during 1911 amounted to 12,590,408, and the number of passengers to 134,249,967. The total resident population in the districts served by the Corporation tramway cars amounts to approximately 838,000.

Tenders must be enclosed in the envelope provided, and addressed to the "Town Clerk, Municipal Buildings, Liverpool," and forwarded through the post so as to be received by him not later than the first postal delivery on Wednesday, the 13th August, 1913.

Form of tender and specification may be obtained upon written application to C. W. Mallins, Esq., A.I.E.E., General Manager, Tramways Department, Central Offices, 24, Hatton Garden, Liverpool.

EDWARD R. PICKMERE,
Town Clerk.

Municipal Buildings, Liverpool,
July 21, 1913.

### CORPORATION OF WAKEFIELD.

Tenders are desired for the supply, delivery, and erection of various plant for extensions to the Works of the Electricity Department. The Works are divided into three sections as follows, and tenders will not be considered for a portion only of any section:—

Section 1.—Water Tube Boiler, Superheater, Stoker, etc.
Section 2.—Steam Turbo-Alternator, Condensing Plant, etc.
Section 3.—High and Low Tension Switchgear.

Appointments to view the sites of the works (after August 5) to be made with the City Electrical Engineer, Old Town Hall, Wakefield, who will also supply copies of the specifications and general conditions on receipt of a deposit of £1, which will be refunded on receipt of a *bonâ-fide* tender. Further copies may be had if desired at a charge of 5s. per copy, which will not be refunded.

Sealed tenders, endorsed "Electrical Extensions Section —," must be sent to A. C. Allibone, Esq., Town Clerk, Town Hall, Wakefield, and must be delivered not later than noon on the 1st day of September.

The Corporation do not bind themselves to accept the lowest or any tender.

H. A. NEVILL, M.I.E.E.,
City Electrical Engineer.

### COUNTY BOROUGH OF BURY.

Tenders are invited for the supply of One 2,000/3,000 kw. Turbine Alternator, with Exciter and Surface Condenser.

Copies of general conditions and specification can be obtained from Mr. S. J. Watson, M.I.E.E., Electricity Works, Bury, on payment of a deposit of two guineas, which sum will be returned on receipt of a *bonâ-fide* tender.

Tenders enclosed in the official envelope are to be delivered to the undersigned not later than noon on Monday, August 25, 1913.

JOHN HASLAM,
Town Clerk.

Municipal Offices, Bank Street, Bury,
July 29, 1913.

### HUDDERSFIELD CORPORATION.

The Highways Committee of the Huddersfield Corporation are prepared to receive tenders for Street Watering Motor Vans.

For full particulars apply to the Borough Engineer.

Tenders to be delivered at this office not later than 9 a.m. on Wednesday, the 6th of August next.

K. F. CAMPBELL, M.Inst.C.E.,
Borough Engineer.

Huddersfield, July, 1913.

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## POSITIONS VACANT.

### PORT ELIZABETH MUNICIPALITY.

ASSISTANT ELECTRICAL ENGINEER.

The undersigned are authorised to receive applications, on or before August 19, for the appointment of Assistant Electrical Engineer. Candidates must have had a thorough electrical and mechanical training, and be competent to take entire charge of a direct current system, and, in the absence of the Chief Engineer, to formulate and carry out high tension extensions, including generating plant, feeders, etc. Salary £500 per annum. Passage paid outwards. Applicants must state qualifications, age and experience, and forward copies of testimonials.

DAVIS AND SOPER,
Agents of the Port Elizabeth Municipality.

54, St. Mary Axe, London, E.C.,
July 23, 1913.

### GOVERNMENT OF WESTERN AUSTRALIA—PERTH.

The Agent-General for Western Australia has empowered Messrs. Merz and McLellan to receive applications for the position of Chief Station Superintendent for the new combined Tramway and Public Power and Lighting Generating Station with outlying sub-stations in Perth. Until the new station is in commission the selected candidate will have to assist in supervising the erection and setting to work of the new power station, sub-stations, and cable work.

Salary £450 a year on a three years' agreement, to date from arrival in the State. Second-class passage out and home again on satisfactory termination of agreement.

Candidates should have had experience of central station management and the operation and erection of H.T. turbo-alternators, water-tube boilers, rotary converters, static transformers, and in the laying and maintenance of H. T. cables.

Candidates must be prepared to take up the appointment in Perth within next four months.

Application by letter, stating age, whether married or single, full particulars of experience, with copies of three latest testimonials, should be sent at once to Merz and McLellan, 32, Victoria Street, Westminster, London, S.W.

### EXPERT RAILWAY ACCOUNTANT.

The Commission on the Unification of Railway Accounts of Peking require the services of a thoroughly competent Railway Accountant. Annual salary £2,000, with first-class passage out and return. Applications, stating age and previous experience, and accompanied by copies of not more than four testimonials, should be forwarded before August 15 to Dr. C. C. Wang, Chinese Legation, London, W. Correspondence will be considered confidential.


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*Telegraphic Address:* "INBRAKE," LONDON.

*British, Foreign and Colonial Representatives:—*

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway and Railway World

**Established in 1892 and Published by**

*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.*

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SATURDAY, AUGUST 2, 1913.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

## FORESTALLING AN AGITATOR.

Dublin possesses an agitator who aspires to become known as the "labour dictator," and in order to increase his affluence he conceived the idea of securing the men of the Dublin United Tramways as contributors to his union. Events show, however, that he failed to allow for the existence of Mr. W. M. Murphy, the veteran chairman of the Company. In his fifty years' experience in the employment of labour as a contractor Mr. Murphy has not only avoided strikes but he has never had any serious friction with his men, for the reason that he has always been ready to meet them, not as master to servant but as man to man and a friend in time of trouble. As a railway director, too, he has witnessed the failure of all the railway strikes in Ireland during the past thirty years. Under these circumstances it is not surprising to find, as reported in another column, that Mr. Murphy forestalled the agitator by inviting the men to a meeting, and announcing that the directors had decided to grant them improvements in their conditions that will entail a charge of £2,250 per annum on the company, in addition to £1,500 given two years since. The liberality of the company is evidenced when it is considered that they have no means for recouping the shareholders, as the railway companies have done, by raising their rates. Besides these advantages, so gracefully given, the directors have for some time had under consideration the question of pensions, as a number of the men have thirty years' service to their credit. Hitherto the men, on retirement, have been given pensions without any scale, but in a short time free pensions are to be given to every man of a certain age and who has had a certain length of continuous service. What the men thought of the proposals was shown by the cheers which they gave for the directors and officers, while a motorman was eloquent in testifying that hunger and poverty have been the result of strikes stirred up in other branches of labour in Dublin within the last few years. Mr. Murphy pointed out that the directors are always accessible to any man or section of men, and he was well advised in stating that authority had been given to the manager to dismiss any man who uses threats to induce men to join a union. In taking this course Mr. Murphy, we may add, stands upon strong ground, for both the Royal Commission, whose report gave workmen the right of combining, and the 1911 Commission on Railway Conciliation Boards, were firm in declaring that there should be no intimidation of workers who did not desire to enter the unions. This is a fact of which unionists nowadays are ignorant. An example of their ignorance was shown on July 25, when a deputation of two of the Cardiff union, in submitting to the Cardiff Tramways Committee a plea for increased wages, took with them the secretary of the London branch to put forward an audacious demand that all the local men shall become members of the union by August 16. Sir John Courtis replied that he was not in favour of coercion or tyranny. The Committee would have done well if they had advised the agitator to go and make his demand before the London County Council. Evidently unionism is in a bad way in the Metropolis, or the secretary would not be able to find time to discharge such a task for the Cardiff men. Many of the London tramway men south of the Thames have formed an organisation of their own on purpose to be rid of trade union methods.

## TELEPHONE WIRES CROSSING TROLLEY WIRES.

At an extrordinary meeting of the Municipal Tramway Association held in June last it was decided after full consideration to accept the offer of the Postmaster-General with reference to telephone wires crossing trolley wires, contained in his letter of February 13 last, and amended after a further conference with a special deputation on April 15. We have now received from Mr. C. J. Spencer, hon. secretary of the Association, a copy of the letter referred to, together with an abstract of the points raised at the Conference, slightly amending the terms so far as the cost per circuit is concerned, and a copy of the resolution accepting the terms offered. We give these in full below. A full report of the proceedings at the first Conference on the subject between representatives of the Municipal Tramway Association and the Tramways and Light Railways Association was given in our issue of November 12, 1912.

LETTER FROM THE POSTMASTER-GENERAL.

13th February, 1913.

With reference to the deputation representing the Municipal Tramways Association, which waited upon the Postmaster-General on the 25th of October last, I am directed to inform you that the Post Office engineers have given very careful consideration to the possibility of adopting some method of protecting the telegraphs from tramway power circuits, which while not less effective than guard wires shall not be open to the objections referred to by the representative of the Association.

As the Association is aware, the erection of aerial cable is impracticable in many cases, and it is always more or less unsatisfactory from an engineering point of view as well as being expensive, while the construction of underground work at the Post Office expense where the telegraphs were in dangerous proximity to trolley power circuits, as was explained to the deputation, could not be financially justified. There is, however, now available an insulating material which will admit of the insulation of each wire crossing a power circuit at a comparatively low cost. While in some ways this method of protection may not prove so satisfactory from the Post Office point of view as the provision of guard wires, the Postmaster-General is prepared to adopt it on certain conditions in view of the representations of undertakers that guard wires interfere with the efficient working of their tramway systems. On the new system the cost of insulating a span of one circuit of two wires will be about 11s. 6d.; but the association will readily appreciate the advantage of avoiding continual applications to undertakers for the cost of insulating such circuits added to a crossing. The average number of wires in a bed crossing a tramway route may be taken as sixteen, and I am to suggest therefore that when a tramway undertaker desires to avoid the erection of guard wires, he should pay a first and final charge for each post office crossing (*i.e.*, any arrangement of wires under which all wires are terminated on one side at least on the same support) of £4 10s. when the Post Office is first comer, and £2 5s. when it is second comer.

Of course, when the Postmaster-General is first comer a further initial charge would in each case be made to cover the cost of taking down and re-erecting the circuits already in existence.

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The proposal to use insulated wire cannot for the present apply to trunk wires and wires running parallel to power circuits for considerable distances. Such works, however, are only concerned in a very small number of cases and cannot materially affect the main question.

The Postmaster-General cannot admit that the obligation of the undertakers to bear the cost of protection is affected by the fact that the Post Office wires may be erected subsequently to the construction of the tramway.

As was pointed out to the deputation, Parliament in the interests of the public has conferred upon the Postmaster-General a right to erect and maintain telegraphs upon and over public roads which is prior and superior to the right of any undertaker acting under statutory powers.

This right is recognised by the insertion in all Tramway Acts and Orders of a clause providing that undertakers shall comply with such reasonable requirements as the Postmaster-General may make from time to time for the protection of his telegraphs. At the conference held at the Board of Trade in 1905 the Post Office contention that the cost of providing protection for the telegraphs should be borne by the undertakers even when the Post Office was second comer was admitted to be reasonable, and it was only as an act of grace that the Post Office agreed to bear one-half the cost.

In view of representations from various bodies that the new methods should be introduced as soon as possible, the Postmaster-General will be glad to learn at the earliest convenient date that the proposals are regarded as satisfactory.

I am, Sir, your obedient servant,
A. M. OGILVIE.

On April 15 a deputation from the Municipal Tramways Association and the Tramways and Light Railways Association waited upon the Postmaster-General, when the following three points were raised :—

(1) That, as the acquisition of the National Telephone Company's plant by the Post Office had altered the situation, the arrangement concluded in November, 1905, under which in second comer cases the Post Office paid half the cost of protection should be revised in favour of the undertakers.

To this the Postmaster-General replied that the general purchase agreement between the Postmaster-General and the National Telephone Company was known before the arrangement (having been approved by Parliament after public discussion in August, 1905); that even apart from this, the acquisition of the National Telephone Company's plant did not affect the matter, which was a question of principle; that the arrangement made in 1905 was, as stated by the Board of Trade, offered as a final settlement and accepted accordingly, and that, if the question were re-opened he should go back and decline to bear any part of the cost even in second comer cases.

(2) Whether the Postmaster-General was willing to regard the Post Office as second comer where existing guard wires were taken down at the request of the undertakers, and the necessary protection afforded by the use of insulated wire.

The answer was in the negative.

(3) Whether the Postmaster-General would consider the question of revising the calculated average number of 16 wires in a crossing.

An offer was made for the present, at any rate to charge for protection at the rate of 5s. 9d. per circuit in second comer cases, 11s. 6d. in first comer cases, and to render an annual account to the various undertakers for the work actually done over their lines.

RESOLUTION PASSED BY THE MUNICIPAL TRAMWAYS ASSOCIATION.

That this extraordinary general meeting of the Municipal Tramways Association held on June 18, 1913, having heard the report of the Executive Council on the negotiations with the Postmaster-General regarding telegraph and telephone wires crossing tramway wires, recommends the municipalities to accept the offer of the Postmaster-General contained in a letter from the Post Office dated February 13, 1913, and amended at a Conference which a special deputation had with the Postmaster-General on April 15 last, as being the best terms obtainable from the Post Office.

This meeting at the same time desires to record its keen disappointment that the Postmaster-General has not seen his way to reconsider the principle of this matter, seeing the change which has taken place by the taking over of the National Telephone Company's system by the Post Office, which circumstance has in the opinion of this meeting entirely altered the condition of things obtaining at the time of the agreement arrived at in 1905.

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**Settlement of Edinburgh Strike.**—After lasting for twelve days, the strike of the Edinburgh tramway employees came to an end on July 31, on the following terms :—(1) All men on strike to be reinstated to their former positions; (2) the directors to receive the representatives of the men; (3) the farthing increase per hour be accepted; (4) a week's holiday per year be given to the men with pay, to start immediately; (5) the Lord Provost to preside at a conference in September or October to adjust other outstanding grievances, such as fines, and various other questions. The terms were agreed to at a conference presided over by the Lord Provost. Prior to the meeting, 37 cars had been put in service, each car being accompanied by two constables. By some strange procedure the union headquarters had come to recognise the strike, and collections in the city up to Tuesday had realised £265. The magistrates on Tuesday refused to license the drivers put forward by the manager, apparently because each man had had experience only on one section.

## ILFORD'S PROPOSAL TO THE L.G.O.

OBJECTIONS TO THE TERMS FOR THROUGH TRAMWAY SERVICE.

A report from Mr. L. H. Harvey, the new manager of Ilford Council Tramways, was adopted at the July meeting of the Council. Mr. Harvey recommended that the Council should for six months try a partial scheme of through running which had been discussed between himself and Mr. Holmes, the manager of the Barking Tramways, subject to a universal penny fare being adopted and also subject to the London General Omnibus Company agreeing at the same time to abolish half-penny fares in the district, as arranged verbally by Mr. Harvey with their manager some time ago. An alternative scheme of through running with Barking was also submitted. The Tramways Committee recommended that negotiations be entered into with the Barking Council. They further reported that they had instructed the manager to negotiate with the Omnibus Company with regard to the adoption by them of universal penny fares in the Ilford district.

During the discussion objection was raised to the proposed abolition of half-penny fares, and an undertaking was given that the whole question would come before the Council for discussion before half-penny fares were abolished.

Mr. Holmes reported that he had had 23 interviews with the London and West Ham Tramways authorities on the question of through running. "Their suggestion," he said, "is that in return for the Barking inter-running we should allow every other car now running from Aldgate to our Clock Tower to run to Chadwell, in addition to our own present service, that we should receive the fares that these cars take in our area, and that we should pay the through authorities for their cars the sum of 5¼d. for every car mile run by them on our lines. Roughly worked out, this scheme would mean that we should have to pay the through authorities over £10,000 per year for their cars in our area, and we should perhaps get £5 or £10 per week extra takings by their cars on the High Road route. If, on the other hand, these through cars in our area were to displace an equal number of our own cars, then it would mean that we should be paying a far greater price for strange cars to do our local traffic, which we are capable of doing ourselves at a cheaper rate, as it does not cost us 5¼d. to run our cars. Not only this, but the excessive current used and the extreme wear on the track by reason of their heavy cars would be matters of great moment to us, and, moreover, a number of our cars would be laid up and our staff reduced, with the only result that Ilford would have a very much more irregular local service at a greater cost than it has at present. In either event, it appears that the through cars would be the only ones to benefit by the scheme, due to the fact that they would enlarge their picking-up ground for their through traffic, with practically no benefit to Ilford. It is an undoubted fact, shown by the census I have taken on several occasions, that the through cars cannot possibly give a regular local service in Ilford, owing to the inevitable delays on their route further up the line, and this is emphasised by Barking having protested already against the inadequate local service by the through cars on the Poplar route.

"Another point that must not be lost sight of is, that owing to the extreme weight of the L.C.C. and West Ham cars, and, in my opinion, to the method of using the magnetic brake by the motormen, the question of permanent way renewals would be a very serious one. Our rails are light in section, far lighter than those of the L.C.C., and they would be very quickly worn out, far sooner indeed than the period of our loans allows for, and this would mean that our rails would have to be renewed out of revenue, as we are, of course, unable to get fresh loans granted until the expiration of the old ones. The question of renewing rails out of our present revenue is out of the question, and, moreover, our reserve fund is approaching depletion, and nothing therefore would be left except to raise a rate in aid of the work. As a matter of fact, our short length of track on Ilford Hill, upon which the through cars are now running, will shortly have to be renewed, owing to the extreme wear, and this work will have to be paid for out of what reserve funds we have remaining."

## IMPERIAL MOTOR TRANSPORT CONFERENCE.

The Marquis of Crewe addressed the delegates of the Imperial Motor Transport Conference at their inaugural meeting at Olympia on July 21. He said it was a matter of pride to them, particularly in an age when they in England were sometimes prone to carry self-depreciation to an almost humiliating length, to be able to say that in the matter of mechanical transport for commercial purposes they might claim to stand ahead of any other country in the world. It was most appropriate that the conference should meet in London, because there was no place where the problems of transportation were nearly so urgent or so difficult.

The Hon. Arthur Stanley, M.P., succeeded Lord Crewe in the chair on the first day, when the attendance included many representatives of municipal authorities in this country. Sir Boverton Redwood and Professor V. B. Lewis submitted a paper on petrol substitutes for use in motor vehicles, in which they contended that the manufacture of motor spirit on a really larger scale either from shale or from coal was a somewhat complicated industrial problem. On the other hand alcohol could be made in almost unlimited quantities, with the immense collateral advantage of creating a new industry which could not fail to be of the greatest importance, but would benefit agriculture and give us a fuel that could not be cut off in time of war. Under existing conditions

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alcohol was not an ideal fuel, but there was reason to believe that the objections which had hitherto attached to its use in motor vehicles might be overcome, and the gain in overcoming them would be so very great that there was ample justification for taking such action as might be necessary for that end. The first step was to construct a motor specially suited to this fuel.

The conference adopted the following resolution, on the motion of Sir Boverton Redwood :—"That having regard to the high price of petrol and the limited quantities of petroleum, coal and oil shale available and the obvious fact that these sources of volatile liquid hydrocarbons are in course of depletion, it is desirable that attention should be directed to the construction of a motor suited for use with alcohol, and that, concurrently, action should be taken with a view to the ultimate creation of an adequate supply of fuel obtainable at a sufficiently low price." It was resolved that a committee should be appointed to further the idea and to suggest ways and means. Mr. A. W. Southey submitted a proposal, which was seconded by Dr. Lessing, to the effect that an adequate amount of spirit could be obtained from coal-tar oil. This, however, was negatived.

On July 24 Colonel H. C. L. Holden dealt with the standardisation of mechanically-propelled commercial vehicles for military purposes in time of war, and Captain A. E. Davidson, secretary to the War Office Mechanical Transport Committee, read a paper dealing with the situation which would be created on the outbreak of war, to meet which the War Office had offered a subsidy to makers and owners of vehicles fulfilling certain conditions.

Resolutions were carried recommending consultation between the Government, military authorities, users, and manufacturers throughout the Empire on the subject of mechanical transport subsidy and that a permanent Imperial Motor Transport Committee, provided with subsidies from the Governments and Chambers of Commerce of the Empire, should organise visits of automobile designers to the Oversea Dominions to obtain the data requisite for improvements in self-propelled vehicles.

Other papers included one on motor transport in South Africa, with special reference to the railway service, by Mr. W. W. Hoy, general manager of the South African Railways and Harbours; and on the relations between British manufacturers and oversea buyers by Mr. G. Hamilton-Grapes.

## PROTECTIVE DEVICES AT GREENWICH POWER STATION.

At the meeting of the London County Council last Tuesday a specially important report was presented by the Highways Committee upon the subject of guarding against breakdowns at Greenwich power station. The Committee stated that they had given special consideration since the serious breakdown of plant at the station in April last to the question of arranging for the installation of protective devices with the object of guarding against breakdowns in future. Mr. A. L. C. Fell, chief officer of tramways, had conferred with Mr. G. W. Partridge, chief engineer of the London Electric Supply Corporation, and as a result the chief officer had submitted certain proposals. The cost of giving effect to the scheme was estimated at £25,000, including £7,000 for the switchgear required for the two 8,000 kw. turbo-generators, which the Council on May 6 last decided to obtain from the British Westinghouse Company. The Committee were strongly of opinion that these protective devices should be installed, and they recommended accordingly. They also proposed that Mr. Partridge should be paid 200 guineas.

The Finance Committee, reporting on the matter, said that the principal question which arose from the financial point of view was the bearing of this expense, regarded as an insurance against further breakdowns. A breakdown such as that which occurred recently was a very serious matter as regarded loss of revenue, and it was also very important to establish and maintain the prestige of the tramway undertaking for reliability. If this could be secured by the expenditure proposed the money might perhaps be regarded as well spent. While this was so, this new charge on the undertaking at the present time in order to preserve existing revenue was a serious matter. The report was approved.

## L.C.C. TRAMWAY MATTERS.

The London County Council held their last meeting before the summer recess on Tuesday, when voluminous reports were presented by the various Committees. The Council sat from 3 p.m. on Tuesday until 8 a.m. on Wednesday.

### GENERAL ADOPTION OF PASSENGER QUEUES.

The Highways Committee in their report referred to Section 30 of the Council's Tramways Act of 1912, which gives power to make by-laws requiring passengers waiting to board cars at any stopping place or terminus to wait in lines or queues, and to enter the cars in the order in which they stand. The Committee had been in communication with the Home Secretary with a view to the framing of a suitable by-law, and the Home Secretary had intimated that he would be prepared to approve a by-law in the form in which the Committee now recommended. This proposed by-law stated that on occasions when six or more intending passengers were waiting at any stopping place or terminus they should form up in a line or queue two abreast, when directed by any officer of the Council, and no person should take a place in the line out of proper order, or should enter the tramcar out of the order in which he stood. A penalty not exceeding 40s. was provided for.

### RECONSTRUCTION OF TRAMWAYS.

In regard to the reconstruction of the horse tramways in Ball's Pond Road, between Southgate Road and Kingsland Road, the Committee had been in communication with certain firms who had recently carried out construction and reconstruction for the Council. Messrs. Dick, Kerr and Company were prepared to undertake the tramways and street improvement works at the prices submitted on April last in their tender for the reconstruction of the horse lines from Highbury Station to City Road. The Committee were of opinion that the offer was a reasonable one, and that it should be accepted.

### GREENWICH POWER STATION.

The Committee had considered tenders for the provision of condensing water pipes to be laid in the bed of the River Thames at Greenwich power station. They had not yet been able to decide as to the tender which should be accepted, and they proposed that they should be authorised to deal with the tenders during the summer recess. It would be necessary to provide certain new switchgear in connection with the turbo-generators which were being obtained for the power station, as well as various protective devices of the existing switchgear. The Committee recommended that their chairman and vice-chairman be authorised during the summer recess to open any tenders received, and to accept the most favourable.

The Committee had considered tenders for the purchase of the undermentioned plant, the use of which was to be discontinued at Greenwich power station :—Two 3,500 kw. reciprocating engines and generators, and two 150 kw. Belliss engines and generators with condenser. They had accepted the highest tender received for the reciprocating engines, that of George Cohen and Sons, which was on the basis of the weights of the component metals. None of the tenders received for the Belliss engine was satisfactory.

### IMPROVEMENTS AT SUB-STATIONS.

In connection with the provision of rotary converters and static transformers at Shoreditch sub-station, the Committee proposed various arrangements for the carrying out of the work, providing for additional offices and foundations for the rotary converters. The expenditure was estimated at £2,510, and it was proposed that tenders for the execution of the building work should be invited, and that the chairman and vice-chairman of the Committee be authorised during the summer recess to accept the most favourable tender for the foundations.

The following tenders had been considered for the provision of certain additional switchgear for Shoreditch, Camberwell, and Woolwich sub-stations and the central car repair depôt :—

| | £ s. d. |
|---|---|
| Spagnoletti, Limited | 999 14 0 |
| Johnson and Phillips | 1,068 0 0 |
| Ferranti, Limited | 1,100 5 0 |
| Switchgear and Cowans | 1,140 18 6 |
| Eckstein, Heap and Co. | 1,330 15 0 |
| A. Reyrolle and Co. | 1,387 11 0 |

The estimate of the chief officer was £950. The Committee proposed that the tender of Spagnoletti, Limited, should be accepted.

### TROLLEY WIRE CONTRACT.

The Committee had considered the following tenders for the supply of five miles of 4/0 grooved trolley wire :—

| Names of Firms. | Price a Mile. |
|---|---|
| | £ s. d. |
| Thompson and Co. (providing for manufacture in France) | 87 15 0 |
| Frederick Smith and Co. (*accepted*) | 93 6 8* |
| | (81 13 4 a ton) |
| British Insulated and Helsby Cables | 94 0 0* |
| Thos. Bolton and Sons | 91 13 0 |

* Subject to discount of 2½ per cent.

The Committee had accepted the tender of Frederick Smith and Company.

### MOTOR CARS FOR THE TRAMWAY DEPARTMENT.

The Committee recommended that six motor cars be obtained for use in the tramway department, and that tenders be invited. These were to replace existing cars which had become obsolete, and whose up-keep and petrol and oil consumption were very expensive.

### MUNICIPAL TRAMWAYS ASSOCIATION.

The General Purposes Committee recommended that Mr. W. J. Squires and the chief officer of tramways represent the Council at the annual conference of the Municipal Tramways Association.

### MISCELLANEOUS.

Among minor matters the Committee reported that the Board of Trade had approved of the running of trailer cars between Nile Street and Abbey Wood, and between Beresford Square and Eltham for a further period to October 31.

In view of the amount of work in supervision of the manufacture of rails and special trackwork, it was proposed to employ an additional inspector up to March 31 next, at £4 4s. a week.

It was recommended that tenders be invited for the erection of the extension of Abbey Wood car shed. The completed shed would provide accommodation for 80 cars.

It was further proposed that a new cross-over should be constructed by the tramway department in Peckham Road at a cost of £650.

All the reports were adopted.

### THE REDUCTION OF RATES ON THE TRAMWAYS.

Mr. J. D. Gilbert asked the chairman of the Local Government Committee whether he could state (1) how many assessment appeals had been made against Borough Council valuations of tramway tracks for rating; (2) could he inform the Council if railway companies were also appealing against their local assessments on account of loss of revenue owing to motor 'bus competition;

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(3) would not the effect of the Council's and railway companies' appeals, if successful, be to increase considerably the rates of Borough Councils; (4) was it possible to give the Council any illustration of what any one Borough Council would lose over reduction of tramway and railway rates, and what increase there would be owing to increased road charges?

Mr. E. L. Meinhertzhagen (chairman of the Committee) replied that no appeals had yet been lodged, but objections to the assessment of the Council's tramway lines had been served in 23 boroughs. He understood that at least one railway company was objecting to its assessments, on account of reduced revenue owing to motor 'bus and tramway competition. Any considerable reduction of assessment must necessarily result in an increase in the rate in the £. The loss would not fall eventually wholly upon the borough in which the reduction took place, but would be shared partly by the whole of London. There was one case which he hoped had been settled with a certain Borough Council, though it was not finally settled. The reduction in that case would probably involve an increase in the rates of the first year of less than one-third of a penny in the £, which would be reduced in subsequent years to about a farthing in the £.

## MISCELLANEOUS NEWS AND NOTES.

**More Cars Required at Wigan.**—Alderman Ashton, in moving the adoption of the report of the Tramways Committee, said that at the next meeting it was proposed to ask the Council to sanction the borrowing of money for the purpose of buying six up-to-date cars.

**Trailers on a London Circular Route.**—For two weeks past two trailer cars have been in successful operation on the Tooting, Westminster, and Blackfriars circular route during the workmen's morning traffic. The number will be increased as more of the converted horse cars become available.

**Northampton Development.**—A scheme has been arranged for the extension of the tramways to the Far Cotton suburb as soon as the work of reconstructing the South Bridge has been completed in the near future and Bridge Street has been widened. A parcels delivery system has been inaugurated in connection with the tramways by the manager, Mr. J. A. Gottschalk.

**Bradford's Rolling-Stock Requirements.**—For the year beginning April 1, 1914, the Tramways Committee propose to expend the following sums on rolling-stock: 50 trucks, £4,050; 100 motors, £10,600; 50 resistances, £412; 100 circuit-breakers, £215; 100 controllers, £2,400; 50 power brake sets, £2,500; 50 sets power circuits, £875; 10 car bodies rebuilding, £2,250, total £23,302, less £2,500 value of old equipment.

**Municipal Tramways Association.**—At the meeting of the London County Council on Tuesday last, Mr. W. J. Squires, chairman of the Highways Committee, and Mr. A. L. C. Fell, chief officer of tramways, were appointed to represent the Council at the conference of the Municipal Tramways Association, which will be held at Sheffield on September 24, 25, and 26. The Council, in appointing the representatives, did so on the understanding that it was thereby in no way committed as to its policy in regard to any matters discussed at the conference.

**Proposed Leeds Extensions.**—The Tramways Committee recommend eight extensions of the tramways and the following installations of the railless traction system:—From junction of Wellington Road and Tong Road, *viâ* Copley Hill, Wortley Lane, Mill Green, Sydenham Street, Domestic Street, Holbeck Moor Road, Lane End Place, Hunslet Hall Road, Moor Road, and Church Street to Low Road; from junction of Whitehall Road and Lawns Lane, *viâ* Lawns Lane and Chapel Lane, to a point in Chapel Lane near the Recreation Ground, 60 yards from Hall Lane.

**Coventry and Omnibuses.**—During the discussion on the first annual report of the Tramways Committee, Councillor Pridmore, the chairman, said the Committee had under consideration the question of an extension to Earlsdon, but he thought that first of all they would have to try motor omnibuses, which they could do quickly, but, from the Corporation point of view, they must take into consideration the wear and tear on the roads. Having regard to the congested centre of the town, he thought they should get a small fleet of six omnibuses, and run four regularly and keep two in reserve.

**The Birmingham Difficulty.**—Having reconsidered the proposal to construct tramways across Victoria Square and along Colmore Row, which was referred back to them by the Council, the Tramways Committee reported on July 29 that they can bring forward no feasible alternative to the scheme. They therefore advised that the length of line along Paradise Street be dropped. The Committee have powers already to link up the Suffolk Street line with Congreve Street by way of Easy Row and Great Charles Street, and the Committee will now ask that they be permitted to take the line from the bottom end of Broad Street, and turn to the left into Easy Row, joining the new through line in that thoroughfare.

**Improved Conditions for Dublin Employees.**—At a midnight meeting attended by the employees of the Dublin United Tramways Company on July 20, at the invitation of the chairman, Mr. W. M. Murphy, it was announced that the directors had decided to give an increase of one shilling a week to all the uniform men. Those who were in the first year's service, and who at present did not get a day's leave in twelve, would have a day's leave with pay from the time they started. This would make thirty days a year with pay for all the traffic staff, which Mr. Gordon, the chairman said, told him was more than was given by any other company. The secretary had also been instructed to give each man present half a day's pay for attendance at the meeting on account of losing some of their rest. Unlike railway companies, they could not raise the fares to recoup themselves, the chairman added; in fact, the demand was that they be reduced. They also had under consideration a scheme, which would be ready in a short time, of giving free pensions to every man who attained a certain age, and who had had a certain length of continuous service in the company. The men in the other departments had also been given increases in one way or another. The directors had not the slightest objection to the men joining a legitimate union of their own. Having spoken at length on the coercive methods adopted by strike organisers and the folly of strikes, the chairman said the directors recognised that owing to the increased cost of the necessaries of life, some increase should be given. An advance had been recently given to sundry men in the service, mostly without the asking.

**Private Bill Legislation.**—Morley Corporation Bill came before a House of Commons Committee on July 29, when sanction was given to a clause to enable an arrangement to be made with Leeds Corporation for the running of a railless trolley car service, the traffic not being sufficient to justify an extension of the tramways now existing. Leeds Council were stated to be prepared to run a service of railless cars which would be practically an extension of the Leeds system and would provide a tramway route from Morley to Bradford as well. Morley would take over the whole of the tramways in their area at the end of twenty-six years. It was intended that Morley should borrow the necessary money and that Leeds should pay the instalments of interest and sinking fund in return for the takings on the cars.

**Omnibus Traffic to Pay for Road Wear.**—The Local Legislation Committee of the House of Commons on July 23 approved of the Leicester Corporation Bill except a clause which sought to exclude racegoers from the ordinary passenger cars. Sanction was given to set apart special cars for racegoers and to charge special fares. Other clauses provide for extensions of the tramways, the doubling of existing single lines, and the running of motor omnibuses along Melton Road to Thurmaston, along Groby Road to Anstey, and along London Road to Oadby. The motor omnibus clause was opposed when before the House of Lords by the County Council, but an arrangement had been made with the County Council whereby for the first three years there should be a payment by the Corporation of three-eighths of a penny per car mile, and that after the expiration of that three years' experience there should be an agreement or arbitration respecting the additional cost involved for road maintenance through the running of the motor 'buses. The Corporation were to contribute to the County Council one-third of that expense.

**Bristol Tramways.**—Under section 43 of the Tramways Act of 1870, the Bristol Corporation have the option of purchasing the greater part of the tramways in the city, amounting to 25 miles out of a total length of 31 miles, on May 15, 1914. The Corporation, who are now considering the question of purchase, have found it necessary to obtain not only an estimate of the approximate value of the tramways but also of the probable results from the future working of the tramways either by municipal or private ownership. For this purpose the Corporation retained the services of Mr. J. B. Hamilton, general manager of Leeds Corporation tramways, and Mr. J. F. C. Snell, consulting engineer of the firm of Messrs. Preece, Cardew and Snell, and we understand that these gentlemen are at present completing a valuation of the tramways and preparing a report. When this has been received the Corporation will be in a position to decide whether they should go forward with a Bill in the next session of Parliament to secure powers to work the tramways. Whether they should exercise such powers, if obtained, or allow the company to continue to work the undertaking would, of course, not require to be determined immediately.

## CONTRACTS AND ORDERS.

**Chamberlain and Hookham, Limited,** have received a contract from Falkirk for A.C. meters.

**Bradford Council** have accepted the tender of Collier Bros., Limited, for the supply of 30 miles of copper trolley wire, at £2,668.

**Hillman Motor Car Company** have obtained a contract to supply a motor lorry to the electricity department of Willesden Urban Council.

**Huddersfield Council** have placed contracts with J. Proctor, Limited, for a coal elevator, and with J. Moody and Son for a hydraulic hoist.

**Aberdeen Council** have accepted tenders as follow:—For the clothing of the tramway employees for the next two years: Uniforms, Moore, Taggart, and Company, Glasgow; hats, Perry and Company, Halifax; inspectors' waterproofs, the London Rubber Company; motormen's waterproofs, Steele and Company, Aberdeen.

**London County Council** have accepted the following tenders:—Dick, Kerr and Company, reconstruction of horse tramways in Ball's Pond Road at rates contained in a previous tender; Spagnoletti, Limited, switchgear for Shoreditch, Camberwell, and Woolwich sub-stations and the central car repair depôt, £999 14s.; Frederick Smith and Company, five miles of 4/0 grooved trolley wire, £93 6s. 8d. per mile (or £81 13s. 4d. per ton), less 2½ per cent. discount.

**Johnson and Phillips, Limited,** have secured the following orders for their standard type oil-cooled transformers during the last few weeks:—Two 625 k.v.a., 6,600 v., for Dundee Corporation; two 150 k.v.a., 6,000 v., for Wigan Corporation; one 500 k.v.a.,

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6,600 v., for Oldham Corporation; three 100 k.v.a., 2,000 v., for the Admiralty; fifty-one 50 k.v.a. and three 300 k.v.a., 13,200 v., for Canada; four 400 k.v.a., 10,000 v., for Japan; two 350 k.v.a., 6,000 v., for Brazil. The company have also secured contracts for upwards of 5,000 k.v.a. in transformers for English machinery makers in connection with converting plants, etc.

## PERSONAL.

**The late Mr. James Watts Courtenay** left estate of the gross value of £85,832; net personalty, £71,064.

**Mr. J. H. Cowell,** tramways manager to Blackburn Corporation, has been given an increase of his salary from £400 to £500 by yearly increments of £25.

**Mr. G. Webster's** salary as manager of the Rochdale tramways has been fixed at £350 per annum, rising in two years by annual increments of £25 to £400.

**Mr. J. S. D. Moffet,** the new tramways manager at West Ham, was on July 29 presented by the Rochdale tramwaymen with a silver entree bowl and two silver water jugs.

**Colonel Sir Arthur Yorke,** late chief inspecting officer of railways to the Board of Trade, has been appointed a director of the London, Chatham and Dover Railway, in the place of the late Mr. G. Wyndham, M.P.

**Mr. T. R. Smith,** chief electrical engineer at Leicester, has been granted an increase in his salary from £600 per annum to £700 as from January 1, 1913, to £800 from January 1, 1914, and to £900 from January 1, 1915.

**Mr. G. F. Upcott** has been appointed chief inspector of Walthamstow Council tramways, at a salary of £130, rising by annual increments of £10 to £160 per annum. Mr. Upcott is at present an inspector on the Leyton Council tramways, and was for a number of years employed by the old North Metropolitan Tramways Company. There were 102 applicants for the position.

**Bombay Tramways Officials.**—Sir Charles Ollivant, who presided at the annual meeting of Bombay Tramways and Electric Supply Company, remarked that the company were greatly indebted to the experience, ability, and zealous supervision of the managing director, Mr. Rimington, and no less fortunate in having had a chief engineer with the conspicuous professional attainments and business ability of Mr. Cooper. As the principal local representative of the company, his unfailing tact and courtesy had been appreciated by all, and, under the direction and influence of these leaders, a very efficient staff had been organised, whose excellent service merited warm approbation. It gave the directors great pleasure to see present one of the officials who had been associated with the undertaking from its commencement. He was highly appreciated by the managing director of the old horse tramway company, and had since been appreciated highly by Mr. Rimington, he referred to Mr. Pestonji Mahaluxmiwala. A dividend of one per cent. on the ordinary shares, free of English income-tax, was declared.

## FINANCIAL REPORTS AND MEETINGS.

**The City of Buenos Ayres Tramways Company (1904), Ltd.**—The directors have declared a dividend at the rate of 1s. 3d. per share for the three months ended June 30.

**The Bristol Tramways and Carriage Company, Ltd.**—The directors have declared an interim dividend at the rate of 4 per cent. per annum for the half-year ended June 30.

**Walter Scott, Limited.**—The directors recommend dividends for the half-year upon the ordinary shares at 7½ per cent. (10 per cent. for the year), and on the preference shares at the rate of 6 per cent. per annum.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended July 25 amounted to £54,678. Upon such of the lines as were working both last year and this year the receipts show an increase of £2,797 upon the week.

**Liverpool Overhead Railway.**—The directors have declared interim dividends at the rate of 5 per cent. per annum on the preference shares and 2½ per cent. per annum on the ordinary shares, for the half-year, against 2 per cent. per annum for the corresponding period last year.

**Millars' Timber and Trading Company.**—Presiding on July 28 at the annual meeting, Dr. White said the profit was £157,034, which with the amount brought forward made a total of £186,285. After paying debenture interest and putting £50,000 to depreciation reserve, there was a balance of £114,128, out of which they proposed to pay 5 per cent. on the ordinary shares, carrying forward £29,201. The volume of business and selling price of their hard wood had been well maintained, but the cost of production had increased. Outside the hardwood business they had done very well, and had acquired two subsidiary businesses. The saw mill plant in the Turkish beech forest near Salonika, though delayed by the war, would soon be at work.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended July 26 amounted to £254,891, or £13,178 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £93 19s. 8d. per track mile, an increase of £3 2s. 4d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

August 1, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, August 1. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 67 5 0 .. | 66 7 6 .. | 78 7 6 |
| ,, ,, (three months) .. .. | 67 5 0 .. | 65 12 6 .. | 78 12 6 |
| Electrolytic Copper—bars or ingots .. | 70 10 0 .. | 69 0 0 .. | 81 0 0 |
| Aluminium—bars or ingots .. .. .. | 86 10 0 .. | 89 0 0 .. | 77 0 0 |

## COAL MARKET.

August 1, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| London, free into barge in Thames— | Friday, August 1. s. d. | Last Week. s. d. | A Year Ago. s. d. | Two Years Ago. s. d. |
|---|---|---|---|---|
| Best Admiralty Welsh (large) | 25 6 .. | 25 6 .. | 22 3 .. | 22 9 |
| Best Seconds .. .. .. | 24 0 .. | 24 0 .. | 21 6 .. | 21 6 |
| Ordinary Drys .. .. | 21 0 .. | 21 0 .. | 19 9 .. | 19 3 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 3 .. | 18 9 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 17 6 .. | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 .. | 21 0 .. | 17 3 .. | 18 9 |
| Best Seconds .. .. | 19 6 .. | 19 6 .. | 16 6 .. | 17 6 |
| Ordinary Drys .. .. | 16 6 .. | 16 6 .. | 14 9 .. | 15 3 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 3 .. | 14 9 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 9 .. | 15 3 .. | 14 6 .. | 11 7½ |
| Best Seconds .. .. | 13 6 .. | 13 6 .. | 12 6 .. | 9 10½ |
| Smalls .. .. .. | 9 6 .. | 10 0 .. | 10 6 .. | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | July 29 | £48,275 | £53,615 | 30 | £1,670,763 | +£145,594 |
| Auckland..... (28 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,998 |
| Ballarat and Bendigo | June 15 | 838 | 833 | 11 | 10,426 | — 115 |
| Bombay ..... Rs. | July 4 | 2,983 | 3,106 | 27 | 84,097 | + 3,682 |
| Brazilian St. Rly. Mlrs. | June | 40,854 | 48,882 | 47 | 496,129 | + 17,623 |
| Brazilian Traction..... | July 19 | 81,656 | 95,378 | 29 | 2,635,430 | + 378,635 |
| Brisbane..... | June | 21,570 | 25,013 | 26 | 151,003 | + 43,349 |
| British Columbia .....$ | June | 498,308 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | June | 5,985 | 6,249 | 26 | 39,560 | + 1,361 |
| Buenos Aires Lacroze.. | June | 41,518 | 44,179 | 52 | 529,749 | + 43,906 |
| Calcutta.....Rs. | July 26 | 62,582 | 62,978 | 30 | 19,00,358 | + 87,931 |
| Cape Town ..... | June | 11,076 | 11,560 | 26 | 75,483 | + 4,640 |
| Carthagena & Herreriae | June | 1,671 | 2,158 | 26 | 17,331 | + 6,498 |
| East India ..... | June | 1,788 | 1,892 | 47 | 20,291 | + 2,750 |
| Kalgoorlie..... | June | 3,351 | 2,854 | 26 | 17,226 | — 1,431 |
| La Plata..... | June | 3,557 | 4,846 | 26 | 31,571 | + 6,822 |
| Lima..... | June | 32,175 | 31,200 | 26 | 198,227 | + 8,110 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | July 81 | 25,153 | 27,430 | 30 | 375,087 | + 28,058 |
| Melbourne ..... | June | 57,500 | 56,500 | 26 | 380,500 | + 10,500 |
| Mexico .....$ | June | 558,355 | 588,780 | 26 | 3,265,540 | — 5,881 |
| Montevideo..... | June | 26,392 | 28,820 | 34 | 258,427 | + 20,005 |
| Para ..... | July 27 | 3,775 | 3,613 | 34 | 138,381 | + 2,906 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | June | 2,974 | 3,263 | 26 | 21,871 | + 6,632 |
| Shanghai .....$ | June 23 | 19,775 | 23,200 | 29 | 605,252 | + 49,645 |
| Singapore .....$ | July 26 | 10,044 | 12,486 | 30 | 851,283 | + 39,371 |
| Toronto .....$ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....$ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London..... | July 26 | £4,008 | £4,296 | 30 | £151,352 | +£13,754 |
| City and South London | ,, 26 | 2,778 | 2,748 | 30 | 85,270 | — 7,828 |
| Liverpool Overhead..... | ,, 27 | 1,676 | 1,899 | 30 | 50,660 | + 3,926 |
| London Electric..... | ,, 26 | 11,850 | 12,655 | 30 | 421,980 | + 5,770 |
| Mersey ..... | ,, 26 | 2,009 | 2,113 | 30 | 67,116 | + 4,604 |
| Metropolitan ..... | ,, 27 | 16,764 | 16,817 | 30 | 504,731 | + 3,447 |
| Metropolitan District.. | ,, 26 | 12,022 | 12,785 | 30 | 394,739 | + 16,101 |

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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | July 23 | £1,899 | £2,041 | + £142 | 8 | £12 925 | + £339 |
| Ayr Corporation ..... | ,, 26 | 605 | 1,248 | + 642 | 10 | 4,907 | + 149 |
| Bath Electric ..... | ,, 23 | 1,037 | 1,173 | + 136 | 30 | 27,034 | + 1,014 |
| Birmingham Corp. ..... | ,, 25 | 10,723 | 11,371 | + 648 | 17 | 193,830 | + 13,547 |
| Blackburn Corporation | ,, 24 | 1,186 | 1,356 | + 170 | 17 | 22,568 | + 1,672 |
| Blackpool & Fleetwood | ,, 23 | 1,301 | 1,577 | + 276 | 4 | 5,559 | + 260 |
| Blackpool Corporation | ,, 24 | 2,512 | 2,909 | + 397 | 16 | 27,720 | + 1,989 |
| Bolton Corporation ..... | ,, 27 | 2,692 | 2,870 | + 178 | 17 | 46,531 | + 2,192 |
| Bournemouth Corp..... | ,, 30 | 1,953 | 2,406 | + 453 | 17 | 35,485 | + 3,213 |
| Bradford Corporation... | ,, 26 | 5,411 | 6,006 | + 595 | 17 | 101,094 | + 4,530 |
| Brighton Corporation.. | ,, 27 | 1,300 | 1,245 | — 54 | 17 | 17,804 | — 61 |
| Bristol ..... | ,, 25 | 7,555 | 8,924 | + 1,369 | 29 | 230,214 | + 29,877 |
| British Elec. Traction - | | | | | | | |
| Airdrie ..... | July 25 | 262 | 454 | + 192 | 30 | 10,041 | + 1,460 |
| Barnsley ..... | ,, 25 | 183 | 356 | + 173 | 30 | 7,879 | + 2,888 |
| Barrow ..... | ,, 25 | 501 | 519 | + 18 | 30 | 11,627 | + 588 |
| Birmg. & Mid. Joint - | | | | | | | |
| Birmingham Dist. ... | July 25 | 915 | 971 | + 26 | 30 | 29,932 | + 1,339 |
| Dudley - Stourbridge | ,, 25 | 932 | 1,024 | + 92 | 30 | 27,505 | + 2,323 |
| South Staffordshire .. | ,, 25 | 942 | 976 | + 34 | 30 | 29,457 | + 2,130 |
| Wolverhampton Dist. | ,, 25 | 482 | 519 | + 37 | 30 | 15,180 | + 1,090 |
| Devonport ..... | ,, 25 | 537 | 580 | + 43 | 30 | 15,990 | + 156 |
| Gateshead ..... | ,, 25 | 1,098 | 1,610 | + 512 | 30 | 36,356 | + 6,090 |
| Gravesend & N'thfleet | ,, 25 | 249 | 253 | + 4 | 30 | 6,736 | + 756 |
| Greenock - P.Gl'sgow | ,, 25 | 924 | 1,292 | + 368 | 30 | 25,145 | + 1,691 |
| Jarrow ..... | ,, 25 | 148 | 163 | + 15 | 30 | 4,239 | + 240 |
| Kidderminster ..... | ,, 25 | 146 | 153 | + 7 | 30 | 3,457 | + 85 |
| Merthyr ..... | ,, 25 | 208 | 231 | + 23 | 30 | 6,429 | + 710 |
| Metropolitan ..... | ,, 25 | 9,109 | 9,326 | + 217 | 30 | 236 970 | + 5,309 |
| Middleton ..... | ,, 25 | 362 | 402 | + 40 | 30 | 10,305 | + 563 |
| Oldham - Ashton..... | ,, 25 | 630 | 650 | + 20 | 30 | 18,312 | + 323 |
| Peterborough ..... | ,, 25 | 151 | 199 | + 48 | 30 | 4 935 | + 1,006 |
| Potteries ..... | ,, 25 | 1,966 | 2 074 | + 108 | 30 | 62,126 | + 7 152 |
| Rothesay ..... | ,, 25 | 657 | 1,173 | + 516 | 30 | 6,204 | + 306 |
| Sheerness ..... | ,, 25 | 60 | 67 | + 7 | 30 | 1,526 | + 105 |
| South Metropolitan.. | ,, 25 | 942 | 868 | — 74 | 30 | 21,409 | — 553 |
| Southport ..... | ,, 25 | 383 | 385 | Nil | 30 | 9,117 | + 494 |
| Swansea ..... | ,, 25 | 1,252 | 1,325 | + 73 | 30 | 36,540 | + 3,623 |
| Taunton ..... | ,, 25 | 49 | 55 | + 6 | 30 | 1,396 | + 106 |
| Tynemouth ..... | ,, 25 | 412 | 414 | + 2 | 30 | 7,234 | + 543 |
| Weston-super-Mare .. | ,, 25 | 354 | 416 | + 62 | 30 | 3,940 | + 530 |
| Worcester ..... | ,, 25 | 353 | 410 | + 57 | 30 | 8,946 | + 530 |
| Wrexham & District.. | ,, 25 | 118 | 137 | + 19 | 30 | 3,561 | + 331 |
| Yorks (Woollen) Dist. | ,, 25 | 1,330 | 1,464 | + 134 | 30 | 34,220 | + 2,336 |
| Burnley Corporation .. | ,, 26 | 1,513 | 1,750 | + 237 | 17 | 28,162 | + 2,937 |
| Burton-on-Trent Corp. | ,, 26 | 295 | 288 | — 7 | 17 | 4,806 | + 89 |
| Bury Corporation..... | ,, 27 | 1 281 | 1,431 | + 150 | 17 | 23,357 | + 575 |
| Cardiff Corporation.... | ,, 12 | 2,580 | 2,871 | + 291 | 15 | 40,016 | + 4,167 |
| Chatham and District.. | ,, 24 | 886 | 947 | + 61 | 29 | 26,124 | + 1,255 |
| Chesterfield Corp. ..... | ,, 24 | 229 | 250 | + 21 | 16 | 4,148 | + 471 |
| Colne & Trawden..... | ,, 26 | 285 | 307 | + 22 | 30 | 7,996 | + 415 |
| Cork Electric..... | ,, 24 | 501 | 579 | + 78 | 29 | 14,338 | — 38 |
| Croydon Corporation ... | ,, 18 | 1,944 | 1,697 | — 247 | 15 | 26,273 | — 3,918 |
| Darlington Corporation | ,, 26 | 235 | 265 | + 30 | 17 | 4 224 | + 392 |
| Derby Corporation ..... | ,, 26 | 958 | 989 | + 31 | 17 | 16,614 | + 1,878 |
| Dover Corporation .... | ,, 26 | 300 | 274 | — 26 | 17 | 4,053 | — 194 |
| Dublin & Lucan ..... | ,, 25 | 157 | 213 | + 56 | 3 | 648 | + 51 |
| Dublin United ..... | ,, 25 | 5 906 | 6,823 | + 917 | 29 | 174,969 | + 2,944 |
| Dundee City ..... | ,, 23 | 1,336 | 1,422 | + 86 | 10 | 13,260 | + 945 |
| East Ham Corporation | ,, 26 | 1,086 | 942 | — 144 | 17 | 17 626 | — 954 |
| Exeter Corporation ..... | ,, 25 | 388 | 376 | + 18 | 17 | 5,766 | + 105 |
| Glasgow Corporation ... | ,, 26 | 16 045 | 14,921 | — 1,124 | 8 | 158,863 | + 11,245 |
| Glossop (U. Elec. Supply) | ,, 26 | 130 | 137 | + 7 | 30 | 3,828 | + 434 |
| Halifax Corporation ... | ,, 22 | 2.051 | 2.273 | + 212 | 16 | 34 715 | — 534 |
| Hastings & District..... | ,, 24 | 1,219 | 1,212 | — 7 | 30 | 27.515 | + 1,230 |
| Huddersfield Corp. ..... | ,, 24 | 1,970 | 2,194 | + 224 | 17 | 36,200 | + 1,960 |
| Hull Corporation ..... | ,, 26 | 2,856 | 2 974 | + 118 | 17 | 51,565 | + 2,795 |
| Ilford U.D.C. ..... .. | ,, 26 | 540 | 449 | — 91 | 17 | 7,808 | — 1,395 |
| Ilkeston Corporation .. | ,, 30 | 125 | 141 | + 16 | 18 | 2,319 | + 471 |
| Ipswich Corporation .. | ,, 26 | 548 | 516 | — 32 | 17 | 7,721 | — 15 |
| Isle of Thanet (..... | ,, 26 | 1,411 | 1,413 | + 2 | 43 | 21,354 | + 465 |
| Kilmarnock Corp. ..... | ,, 26 | 251 | 203 | — 48 | 10 | 1,870 | + 30 |
| Lanarkshire ..... | ,, 24 | 1 349 | 1,845 | + 496 | 29 | 48,175 | + 6,384 |
| Lancashire United ..... | ,, 23 | 1,357 | 1,561 | + 204 | 29 | 43 208 | + 4,164 |
| Leeds City ..... | ,, 26 | 7,835 | 8,564 | + 729 | 17 | 140,948 | + 8,677 |
| Leicester Corporation.. | ,, 26 | 2,905 | 3,031 | + 126 | 30 | 82,883 | + 7,795 |
| Leith Corporation ..... | ,, 26 | 763 | 763 | Nil | 10 | 7,806 | + 127 |
| Liverpool Corporation.. | ,, 24 | 12,602 | 13,819 | + 1,217 | 29 | 378,979 | + 26,756 |
| Llandudno & Colwyn B. | ,, 25 | 569 | 641 | + 92 | 34 | 9,124 | + 902 |
| London County Council | ,, 23 | 42.015 | 41,997 | — 18 | 16 | 690,329 | — 23 096 |
| London Gnl. Omnibus.. | ,, 26 | 59,831 | 68,331 | + 8,500 | 30 | 1,844,062 | + 3,86 495 |
| London United ..... | ,, 25 | 7.098 | 7,054 | — 42 | 30 | 182 978 | — 2,374 |
| Lowestoft Corporation | ,, 26 | 338 | 308 | — 30 | 42 | 7,507 | + 307 |
| Maidstone Corporation | ,, 17 | 247 | 213 | — 34 | 16 | 3,186 | + 138 |
| Manchester Corp..... | ,, 26 | 16,436 | 17,605 | + 1,169 | 17 | 299 850 | + 14,354 |
| Nelson Corporation.... | ,, 26 | 197 | 257 | + 60 | 17 | 3,572 | + 150 |
| N'castle-on-Tyne Corp. | ,, 26 | 4 331 | 4,668 | + 337 | 17 | 81,521 | + 6,424 |
| Newport (Mon.) Corp. .. | ,, 26 | 761 | 784 | + 23 | 17 | 12,612 | + 723 |
| New St. Helens & Dist .. | ,, 23 | 783 | 837 | + 54 | 4 | 3,150 | + 351 |
| Northampton Corp ..... | ,, 25 | 571 | 561 | — 10 | 16 | 9,670 | + 208 |
| Nottingham Corp. .... .. | ,, 24 | 3,147 | 3,302 | + 105 | 16 | 55,121 | + 1,585 |
| Oldham Corporation ... | ,, 27 | 2,077 | 2,357 | + 280 | 18 | 39,403 | + 2,055 |
| Portsmouth Corp. .. ..... | ,, 26 | 2,447 | 2,504 | + 57 | 17 | 37,805 | — 443 |
| Preston Corporation .. | ,, 23 | 817 | 861 | + 44 | 17 | 15,012 | + 1,135 |
| Provincial ... .. ..... | ,, 26 | 2,485 | 2,382 | — 104 | 43 | 76,146 | + 3,717 |
| Reading Corporation . | ,, 24 | 633 | 704 | + 41 | 16 | 11,297 | + 518 |
| Rochdale Corporation | ,, 24 | 1,613 | 1,710 | + 97 | 17 | 27,273 | + 490 |
| Rotherham Corp. ..... .. | ,, 30 | 754 | 1,056 | + 302 | 17 | 16,758 | + 4,338 |
| Salford Corporation .. | ,, 24 | 4,938 | 5,278 | + 340 | 17 | 90 041 | + 2 472 |
| Sheffield Corporation... | ,, 27 | 6,711 | 7,303 | + 592 | 18 | 130,560 | + 12,900 |
| Southampton Corp. .. | ,, 23 | 1,347 | 1,435 | + 88 | 16 | 21,308 | + 411 |
| Southend-on-Sea Corp | ,, 23 | 1 014 | 1,185 | + 171 | 17 | 14,689 | + 1,143 |
| South Shields Corp..... | ,, 26 | 692 | 755 | + 63 | 16 | 12,063 | + 1,473 |
| Sunderland Corp. ..... | ,, 27 | 1,365 | 1,520 | + 155 | 17 | 24,230 | + 2 429 |
| Sunderland District ... | ,, 23 | 452 | 595 | + 143 | 38 | 20,336 | + 3,784 |
| Swindon Corporation ... | ,, 24 | 145 | 152 | + 7 | 16 | 2,630 | + 187 |
| Trys. (M.E.T.) Omn. Co. | ,, 26 | ... | 7,845 | ... | 30 | 85,216 | ... |
| TynesideTrys. & Tmrds | ,, 25 | 519 | 531 | + 42 | 4 | 1,746 | — 10 |
| Wallasey Corporation | ,, 26 | 1,222 | 1,323 | + 101 | 17 | 20 833 | + 1,409 |
| Walsall Corporation .. | ,, 26 | 615 | 620 | + 5 | 30 | 18,263 | + 1,241 |
| Walthamstow U.D.C.... | ,, 26 | 827 | 758 | — 69 | 17 | 12,726 | — 832 |
| Warrington Corp ..... | ,, 17 | 506 | 423 | — 83 | 16 | 7,034 | + 249 |
| West Ham Corporation | ,, 24 | 2,603 | 2,709 | + 106 | 16 | 45,650 | + 993 |
| Wigan Corporation ... | ,, 24 | 1,275 | 1 433 | + 158 | 16 | 24,275 | + 2,658 |
| Wolverhampton Corp | ,, 30 | 1,036 | 1,197 | + 161 | 18 | 18,989 | + 1,016 |
| Yorkshire (W. Riding) | ,, 27 | 1,302 | 1,460 | + 158 | 30 | 42,432 | + 4,547 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, August 1. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 79 — 82 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref | ... | 4¾ — 5 |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅜ — 4⅞ |
| 100 | Do. 4% Deb. Stk. Red. ..... | + ½ | 91 — 93 |
| 100 | Do. 4½% Deb. Stk. Red. ..... | ... | 94½ — 96½ |
| 100 | Do. 5% Deb. Stk. Red. ..... | + ½ | 97 — 99 |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | + 1 | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅝ — ¾ |
| 1 | Do. 5% Cum. Pref ..... | ... | 31/32 — 1 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | — ¼ | 13½ — 14 xd |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref ... | + ¼ | 10¾ — 11¼ .. |
| 100 | Do. do. 4½% Db. Stk Rd | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. ..... | + 1 | 87 — 89 xd |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 6¼ — 7¼ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5¼ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. ... | ... | 97 —100 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6 |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 7 — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 94 — 96 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 2 | 123 —128 |
| 100 | Do. Pref. Ord. Stock ..... | ... | 109 —114 xd |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 102½ —105½ |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —102 |
| 100 | Do. 4% Perpetual Cons. Deb. Stk. ..... | ... | 95½ — 97½ |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 78 — 81 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 38 — 41 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 8 — 10 |
| 100 | Do. Deferred Ord. Stock ..... | ... | 3½ — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock..... | ... | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red ... | ... | 73 — 77 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | — 3 | 89 — 93 xd |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | + ⅛ | 98⅝ —100⅛ |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 2¾ — 6¾ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅛ — 5⅛ |
| 100 | Do do. 4½% 1st Deb. Stock, Red. ..... | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., ... .. ..... | ... | ⅛ — ⅛ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. ..... | ... | 3 — 3½ |
| 100 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co (1904), Lim. ..... | + ⅛ | 5⅛ — 5⅜ |
| 100 | Do. 4% Debenture Stock Red, 1935 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ..... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + 1 | 94½ — 96½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. ..... | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1898) Lim. Ord. ..... | — ¼ | — 11 |
| 10 | Do. do. 6% Pref. ..... | — 3/16 | — 12⅛ |
| 100 | Do. do. "A" Red. ..... | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79½ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8¼ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | 3/32 — 3/32 |
| 1 | Do. do. 6% Cum Pref. ..... | ... | 31/32 — 1 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ... ..... | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | — ¼ | 3½ — 4¼ |
| 10 | Do. do. 6% Cum. Pref..... | — ¼ | 6¼ — 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2½ — 2⅝ |
| 100 | Do. 4% Debenture Stock ..... ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 3/32 — 5/32 |
| 100 | Do do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | 31/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 10 — 10½ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 1 1/32 — 1 1/32 |
| 1 | Do. 6% Cum Pref. ..... | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ... ... ..... | — 1/32 | 1/16 — 3/16 |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | ... | 93 — 95 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red | ... | 87 — 89 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | + 3 | 59 — 63 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 4¾ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | — 1 | 86½ — 89½ |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 107 —110 |
| $1,000 | Do. do. 5% Bds. ... . | ... | 99 —101 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1 1/32 — 1 1/16 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. .. | ... | 84 — 88 |
| 100 | Do. 5% Deb. Stock, Red. .. | ... | 91½ — 94½ |
| $100 | Mexico Tramways Co., Common Stock ..... | + 2 | 88 — 91 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bond- | ... | 87 — 90 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — 1 | 86 — 89 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 92 — 94 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) .... | — 2 | 97 — 99 xd |
| 100 | Do. 4½% Sterling Debs, (1922) . | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd ..... | — 1/16 | 1/32 — 1/16 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6¾ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 6½ — 6⅝ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6 — 6½ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4⅝ — 5 |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord..... | ... | 1½ — 1¾ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 9/32 — 11/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | 15/16 — 1 1/16 |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim.. Ord. ..... ..... | ... | 31/32 — 1 1/32 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% .. | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. ... | ... | 5 — 5¼ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... ... | ... | ... — ... |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | + 1½ | 99 —101 |
| 100 | 5% 50-yr. Mort. Gold Bonds ... ..... | + 1 | 92½ — 94½ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | ... — ... |
| $5 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | + 2 | 100 —102 |
| 10 | Shanghai Elec. Construction Co. ..... ..... | ... | 8½ — 9¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 — 89 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref ... | ... | 5/8 — ¾ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 63 — 68 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. .... | — 1½ | 94½ - 96½ xd |
| 100 | Toronto Railway Co. 1st Mt. 4½% Sterling Bonds ... ... | ... | 93 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 83 — 88 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 89¾ — 92½ |
| 5 | United Elec. Tramways of Monte Video, Ord. ..... | ... | 4¾ — 4⅞ |
| 5 | Do. do. 6% Cum. Pref.... ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ -101½ |
| 5 | Yorkshire (West Riding) Elec. Trys Co., Ord. ..... | ... | ⅛ — ¼ |
| 5 | Do. do. 6% Cum. Pref..... ..... ..... | + 1/32 | 3¼ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 7. | LONDON, SATURDAY, AUGUST 9, 1913. | [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone; No. 2948 GERRARD.

## WEEKLY LIST OF TENDERS INVITED.

### CITY OF ABERDEEN.

ADVERTISING ON TRAMWAY CARS.

The Corporation of Aberdeen are prepared to receive tenders for the Advertising Rights on their tramways for a period of five years.

Form of tender, with printed conditions, and any further information required, may be obtained from the General Manager, Municipal Buildings, Aberdeen; and tenders, in a sealed envelope, endorsed "Advertising Contract," must be addressed and delivered not later than 12 o'clock noon on Tuesday, 19th August, to the undersigned.

R. STUART PILCHER,
General Manager.

Corporation Tramways Office,
Municipal Buildings, Aberdeen.
August 8, 1913.

### CITY OF BRADFORD.

TRAMWAYS DEPARTMENT.

TENDER FOR MACHINERY AND TIMBER.

The Bradford Corporation are prepared to receive tenders for the supply of Machinery and Timber, as follows:—

1. One 5-ton Electrically-operated Travelling Crane.
2. One Power-driven Punching and Shearing Machine, to punch up to 1in.×1in. and shear 5in.×1in. flat and 5in.×⅜in. angle.
3. One Semi-automatic Turning and Screwing Lathe, 3in. hole through spindle to screw from ¼in. to 1½in. Whitworth threads.
4. One Armature Banding Machine, to take 4ft. between centres and 15in. diameter.
5. Two Single Smiths' Hearths, Cast-iron, 42in.×42in., with large tue iron Trough and electrically-driven blowers and regulators.
   One Double Smiths' Hearth, 42in.×42in., with large tue iron trough and electrically-driven blowers and regulators.
6. One Tram Wheel heavy Turning Lathe, electrically-driven and capable of recontouring a pair of tyres 33½in. tread diameter in not more than 30 minutes from floor to floor.
7. Hydraulic Car-lifting Jacks, to drawings and specifications.
8. Timber for tramcar bodies.

Schedules and Conditions of Tender may be had on application at the Tramway Offices, 7, Hall Ings, Bradford, on payment of the sum of one guinea, which will be refunded on receipt of a *bonâ-fide* tender. (Cheques to be made payable to the order of the Bradford Corporation.)

The contracts will be let subject to the Fair Contracts Clauses of the Corporation.

Tenders, endorsed "Tender for Machinery, etc.," to be sent to me not later than Saturday, the 30th inst. The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford.
August 2, 1913.

### CORPORATION OF HAVERFORDWEST.

COAL.

Tenders are invited for the supply of about 2,000 tons of Double-Screened Gas Coal of the very best quality, to be delivered at the Haverfordwest Railway Station or at the Gasworks Quay, Haverfordwest, by water communication, in quantities as required by the Gas Manager, during the year commencing on September 1 next, for the Corporation of Haverfordwest.

Tenders by August 18.

Forms of tender and further particulars of

R. T. P. WILLIAMS,
Town Clerk.

Haverfordwest.
July 23, 1913.

### COUNTY BOROUGH OF HALIFAX.

The Tramways Committee of the Halifax Corporation invite tenders for the supply and delivery at Halifax of 200 tons of Girder Tram Rails, B.S.S. No. 4 (60 feet lengths), and 7 tons of Fishplates, all to be manufactured according to the British Standard Specification, and to include the Drilling of necessary holes for Bonds, Anchors, Tiebars, etc.

Firms tendering must state where the material will be manufactured.

Any further particulars may be obtained from Mr. James Lord, M.I.C.E., Borough Engineer, Town Hall, Halifax.

Tenders, endorsed "Tram Rails," must be sent to the undersigned on or before Tuesday, August 19, 1913.

The person whose tender is accepted will be required to observe the fair contracts clauses adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any tender.

By order, PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax.
August 2, 1913.

### ROYAL BURGH OF KIRKCALDY.

ADVERTISING ON TRAMWAYS.

The Town Council invite tenders for the Sole Right of Advertising on their 22 Electric Tramcars for a period of five years.

Specification and form of tender may be obtained on application to O. F. Francis, M.I.E.E., Burgh Electrical Engineer and Tramways Manager, Electricity Works, Kirkcaldy.

Sealed tenders, endorsed "Advertising on Tramcars," addressed to the undersigned, must be delivered by post not later than Monday, August 25, 1913.

The Council do not bind themselves to accept the highest or any tender.

W. L. MACINDOE.
Town Clerk.

August 8, 1913.

### WIMBLEDON.

The Corporation of Wimbledon invite tenders for the supply, delivery, and erection of the following plant at their Electricity Works, Durnsford Road, Wimbledon, namely:—

(*a*) A 1500 kilowatt Turbine-Alternator, with Condensing Plant and Auxiliaries.

(*b*) A 20-ton Overhead Travelling Crane.

Specifications, General Conditions, and Forms of Tender may be obtained from Mr. H. Tomlinson-Lee, Borough Electrical Engineer, Electricity Works, Durnsford Road, Wimbledon, on payment of a deposit of £2 2s. for each copy required, such deposit being repayable on receipt of a *bonâ-fide* tender.

Sealed tenders, in the envelopes provided, are to be addressed to the Chairman of the Electricity Committee, and delivered at the Electricity Works, Wimbledon, not later than 5 p.m. on Monday, the 1st day of September, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

A. STEELE SHELDON,
Town Clerk.

Town Clerk's Offices, Wimbledon.
August 6, 1913.

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## LIVERPOOL CORPORATION TRAMWAYS.

### ADVERTISING ON TRAMWAY CARS.

The Tramways and Electric Power and Lighting Committee are prepared to receive tenders for the exclusive right to Advertise upon the Tramway Cars for a period of seven years, commencing on the 1st August, 1914.

The number of cars, working and spare, excluding first-class cars, is 496, and the total length of line traversed 119 miles. The total mileage of the cars during 1912 amounted to 12,506,408, and the number of passengers to 134,249,967. The total resident population in the districts served by the Corporation tramway cars amounts to approximately 838,000.

Tenders must be enclosed in the envelope provided, and addressed to the "Town Clerk, Municipal Buildings, Liverpool," and forwarded through the post so as to be received by him not later than the first postal delivery on Wednesday, the 13th August, 1913.

Form of tender and specification may be obtained upon written application to C. W. Mallins, Esq., A.I.E.E., General Manager, Tramways Department, Central Offices, 24, Hatton Garden, Liverpool.

Edward R. Pickmere,
Town Clerk.

Municipal Buildings, Liverpool,
July 21, 1913.

## FOR SALE.

### PATENTS FOR SALE.

THE PROPRIETORS OF BRITISH PATENT No. 21703 of 1910 for "Improvements in and relating to Railway Rail Joints," desire to grant manufacturing licenses or to make other arrangements on reasonable terms for the purpose of working the invention in this country.

For full particulars apply Mathys and Co., Chartered Patent Agents, 43, Chancery Lane, W.C.

THE OWNER OF BRITISH PATENT, No. 19462 of 1906, entitled "Improvements in Destination Indicators for Tramway Cars," is desirous of disposing of the patent or entering into working arrangements under license or otherwise with firms likely to be interested in the same.

A copy of the patent specification and full particulars can be obtained from and offers made (for transmission to the owner) to Marks and Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.

(*Continued on page* 103.)

**TRAMWAY SUPPLIES, Ltd.,**
**Tramway Engineers,**
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
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Sole Manufacturers of
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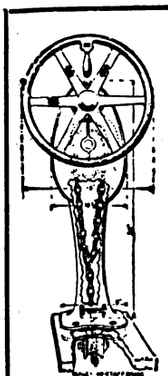

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The British ABC TRADE MARK London.
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Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
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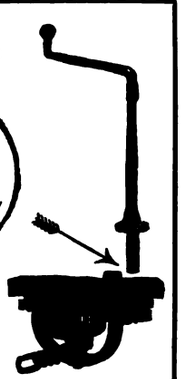

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THE
# Tramway AND Railway World

**Established in 1892 and Published by**

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**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, AUGUST 9, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## RAILLESS TRACTION DEVELOPMENT.

The session of Parliament which is now about to close has been notable for the passing of a considerable number of Bills authorising the use of the railless trolley system of electric cars, both by companies and by local authorities in various parts of England. These, with the schemes sanctioned in previous years, will, when equipment is complete, constitute a very considerable mileage of roads and streets upon which the railless cars will run. The questionable feature about the action of Parliamentary Committees on these Bills has been the imposition (often by agreement reached under pressure) of a charge on the promoters for road maintenance. It is admitted that general legislation is necessary on the question of road maintenance, both as regards railless electric cars and as regards motor omnibuses. The arrangements come to in connection with Bills of the present session can accordingly be looked on only as temporary. The activity in developing the railless system in this country promises to continue, and already proposals for Bills for next session are being considered. Among other places Leeds is working out a large scheme for the extension of the existing trolley routes, which have already given much satisfaction. Another line of advance is indicated at Brighton, where the Corporation, in furtherance of the powers already obtained, are negotiating with the Board of Trade for permission to use double-deck cars. Hence tenders for the vehicles have not yet been invited. There is no reason why a double-deck railless trolley car should be more liable to capsize than a double-deck motor omnibus, so that it is hard to see why there should be any difficulty in getting the desired permission. In countries abroad the system is developing. Towns and districts in the British dominions where there is not sufficient population to warrant the construction of tramways are taking up the railless scheme with avidity. This appears to be particularly so in the Transvaal, and Bloemfontein is among the places which are going ahead in this matter. Perhaps the most interesting fact is that in the United States, the home of the street railway, the trackless system is being tried. A route of this kind is now in operation at Merrill, Wisconsin, where the railless cars act as feeders to existing tramways. The fact that the system has been installed is an indication of the great improvement which has been made in American roads. The street railway first came into existence largely because the streets and roads in America were execrable—as, indeed, they generally are in "new" countries. But increasing population and the lapse of time have brought about improvements in American roads, and apparently we may now look for large developments of the railless system in suburban and semi-rural districts in America. Many American towns are widely and thinly spread out, especially in their suburbs, and this desirable feature, largely due to the existence of street railways, should be further emphasised by the use of the trackless system. It can be easily and cheaply spread out into sparsely populated districts, and with rapid growth of population it readily lends itself to conversion into tramways as soon as that becomes desirable. Though the routes of the cars cannot be varied at will, like those of the motor omnibus, the system presents the double attraction of lower working expenses and of being maintainable by the same staff and with the same sort of apparatus as are required for the already existing tramways.

## PAY-AS-YOU-ENTER CARS AT ABERDEEN.

Mr. R. Stuart Pilcher general manager of the Aberdeen Corporation Tramways, in his annual report states that the Town Council inaugurated the "Pay-As-You-Enter" principle on April 28, 1913, on the Woodside section of the system. Six new cars were built, and four altered and made suitable for the operation of this system of fare collection, making a total of ten cars. This system of fare collection has several outstanding advantages over the other system, the chief of which are that, by the conductor always being on the rear platform, numerous accidents to persons boarding and alighting from the cars are prevented, and the conductor is always in a position to see intending passengers, whilst the department is able to collect all the fares. These cars have been in service for some time now, and the public have become accustomed to them. There is no congestion or delay through the prepayment of fares. The passengers have accommodated themselves to the system and have their fares ready, whilst there have been no rear platform accidents. The receipts have gone steadily up, and although there is a natural increase taking place on this route, there is a large part of the increase in receipts due to the prepayment of fares. It is well known that under the usual method of collecting fares there is a considerable leakage, due mainly to the inability of the conductor to attend to his numerous duties and to collect all the fares.

## COMPARATIVE CHARGES ON CARS AND OMNIBUSES.

West Ham Borough Council is supporting the Croydon Corporation in its application to the Government, urging the necessity of legislation which would equalise the burdens on motor omnibuses and tramway cars. East Ham is another district which is feeling severely the effect of the present unfair conditions. The total payments made by the tramways in Croydon for road maintenance, rates, etc., amount to £139 per car per annum, while the motor omnibuses contribute only £49, of which all but £6 is due to the petrol tax. In East Ham the corresponding figures are £188 and £49, the annual totals being made up as follow:—

| | Tramway Car. | Motor Omnibus. |
|---|---|---|
| Maintenance of Roads ... | £130 0 0 ... | — |
| Rates and Taxes ... ... | 55 2 6 ... | — |
| Licence Duties ... ... | 2 15 0 ... | £5 18 0 |
| Petrol Tax ... ... ... | — | 43 0 0 |
| Totals | £187 17 6 | £48 18 0 |

In addition to the amounts mentioned, the charge on the Corporation cars for capital repayment amounts to £120 each per annum, so that the total charges on the rolling stock amounts to £308 per car.

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## MOTOR TRAFFIC COMMITTEE.

The Select Committee of the House of Commons on motor traffic met on several days this week to consider the draft report submitted by the chairman, Sir George Toulmin, M.P. The report, it is stated, consists of some 50 pages, summarises the large body of evidence laid before the Committee, and makes various recommendations. It is expected that the report will be completed and adopted in a few days, and that it will be issued before the close of the Parliamentary session. Forecasts of the principal recommendations indicate that the Committee will strongly recommend the appointment of a central Traffic Authority, the formation of which, it will be recalled, was urged by the Royal Commission on London Traffic of 1905. In view of the increasing number of fatal accidents due to the motor omnibus it is felt that the Committee must make some recommendations which will tend to increase the safety with which these vehicles are now worked.

## HOBART MUNICIPAL TRAMWAYS.

The Hobart (Tasmania) tramway system, which was taken over by the City Council on July 1, was constructed by Messrs. Siemens Brothers and Company, and was described in the *Tramway and Railway World* of January, 1895. The present manager, Mr. A. C. Parker, went out as the representative of Messrs. Siemens Brothers, and under his supervision the first cars started running in November, 1893. In the following year the undertaking was handed over to the Hobart Electric Tramway Company. The service was begun with about 20 cars, of which 10 are still in service. The power station equipment has been extended, and during the last four years two 300 kw. sets have been installed, with one of the latest Babcock and Wilcox tubular boilers, with automatic stoking appliances. During the whole of the 20 years that the line has been in operation only one fatal accident has occurred, a record which probably has not been equalled in the history of electric tramways.

## ENGINEERING APPOINTMENTS ON THE ROAD BOARD.

The Road Board have appointed Mr. Henry Percy Maybury, M.Inst. C.E., the county surveyor of Kent, as chief engineer to the Board. Colonel Crompton, C.B., will continue to act, as he has hitherto done, as consulting engineer. Mr. Maybury will commence his new duties as soon as the Kent County Council fill the vacancy in the post of county surveyor, which will probably be in the month of November next. The Road Board have also added to their engineering advisory committee Mr. E. Parnell Hooley, the county surveyor of Notts, and Mr. Alfred Dryland, the county surveyor of Surrey.

## NEW AND PROSPECTIVE WORK.

CALCUTTA.—In reply to a request by Calcutta Council for extension to the tramways in five directions in the southern part of the city, the Tramways Company have stated they understand that the Calcutta Improvement Trust have under consideration several schemes for the widening of the existing, and opening out of new roads and are dealing with the question of the future expansion of the city generally. The company suggested that the proposals of the Corporation should be referred to the trust for an expression of opinion as to the advisability of constructing the tramway extensions referred to. The Council resolved to press the proposals upon the attention of the Improvement Trust in view of the provisions in their Act enabling them to subsidise tramway companies.

CARDIFF.—It is recommended by the Tramways Committee that the line between Kelom Road and Roath Park be doubled at a cost of £2,940, and the city engineer has been instructed to report on the cost of doubling the remaining length of line.

DUNFERMLINE.—The magistrates recommend the Town Council to accept a modified payment of £60 per mile for the maintenance of the Dunfermline and District Tramways Company's lines in the city for five years upon the condition that the proposed extension to Milesmark fails to pay.

THE IPSWICH (QUEENSLAND) IRON AND COKE COMPANY propose to instal electric tramways, and to erect a power house at West Ipswich to supply current for liyhting and power purposes to private consumers.

KILKENNY.—Borings and excavations for the testing of the coal field in the county of Kilkenny not having borne out the anticipations of the geologists, the scheme for a broad gauge railway from Castlecomer to Kilkenny has given place to a proposal for the construction of a light railway instead at an estimated cost of £40,000, including rolling stock. At the suggestion of the county surveyor, the line is to be laid alongside the public road, taking 4ft. off the present width of 26ft., the rails to be protected by a kerbing raised from six to nine inches on each side. At crossings the track is to be paved, and level girder tramway rails with suitable grooves are to be laid. The County Council have sanctioned the scheme. Mr. Ryan is the engineer.

WELLINGTON.—The Tramways Department's estimates for the current year provide for an expenditure of 34,800 on new works, including £9,264 for new cars, £5,020 for a new boiler and other plant for the power station, and £5,164 for car shed extension.

## MISCELLANEOUS NEWS AND NOTES.

**Brighton Tramways Committee** have decided to spend about £5,000 in renewing the track in London Road.

**No Free Passes.**—Brighton Tramways Committee have declined to grant free tramway passes to members of the Council.

**Permanent Way Labourers.**—The rates of wages of permanent way labourers on the Glasgow tramways has been fixed at 6d. per hour. This involves a small increase for about 5 per cent. of the men.

**Request for Departure Indicators.**—Stoke-on-Trent Council have requested the Tramway Company to provide the necessary apparatus at the termini for automatically indicating the times of departure of the cars.

**Track on Wooden Sleepers.**—The borough engineer of Bolton has been instructed to arrange for an experiment with the construction of track on wooden sleepers fixed transversely. A length of about 200 yards will be laid down.

**Railless Traction in the United States.**—The first railless traction installation in the United States has recently been completed at Merrill, Wisconsin. The line is a little over a mile long, and is to serve as a feeder to the tramway system.

**Traffic Inducement.**—Devonport and District Tramways Company are advertising a ten-mile ride through rural scenery for fivepence. For sixpence the Portsea Tramways Company give a ride of ten miles, the cars passing through attractive country.

**Motor Omnibuses on Bank Holiday.**—No fewer than 3,000 omnibuses were run by the London General Omnibus Company on Bank Holiday, and it is estimated that, in the aggregate, not less than 2,000,000 persons used them during the day.

**Fares Collection at Liverpool.**—Although the trial period of three months which was given to the pay-as-you-enter system on the Walton tram route has not elapsed, the old method of collecting the fares after the passenger is seated has been resorted to. The cars are not specially fitted for the prepayment system.

**Leeds Railless Trolley Extensions.**—The Leeds Sub-Tramways and Electricity Extension Committee has recommended that application should be made for power to carry out a number of tramway and railless trolley route extensions. The estimated cost of these is £190,000.

**Accumulator Traction.**—The Australian "Mining and Engineering Review" states that the Townsville, Queensland, Council has granted Messrs. Minham and Sons an extension for six months of the option for their scheme of electrical tramways on the electric accumulator system.

**Tramways and Kingston Bridge Widening.**—Surrey County Council were informed on July 29 that the London United Tramways Company had paid their contribution of £10,000 towards the cost of widening Kingston-on-Thames Bridge. The work is making good progress.

**Interrupted Service in Fifeshire.**—The service of cars on the Dunfermline and District Tramways was interrupted for several hours on Monday owing to the breakdown of a turbo-generator in the station of the Fife Electric Power Company, who supply the tramways with electricity.

**Motor Omnibuses in Wales.**—At a meeting of the Penybont Council recently, it was decided, on the recommendation of a conference of local Councils which had considered the question of railway facilities in the district, to invite motor-'bus companies to establish a motor service.

**London Employees and Superannuation.**—Without the intervention of a trade union the South London tramwaymen employed by the County Council are asking for the institution of a superannuation fund. They also ask for their position to be made more secure as they are considered to be daily servants, although their wages are paid weekly.

**Nottingham District Tramways.**—The Nottingham and Derbyshire Tramways new line from Langley Mill to Cinder Hill, a portion of the line from Ripley to Nottingham, was successfully run over on Monday. The whole of the new line, from Cinder Hill to Ripley, will be 12 miles in length, and it will be linked up with Nottingham Corporation tramways. The generating station is at Ilkeston.

**Motor 'Bus Accident at Hertford.**—A motor omnibus conveying a private party from Cambridge to Waltham Cross on Saturday night last was overturned, three men being killed and twenty-six injured. The omnibus was descending a hill at Amwell, about mid-way between Ware and Hoddesden, when all the passengers were thrown to the ground. Only the motorman and guard escaped injury. The former stated that the accident was due to his having attempted to avoid a careless cyclist.

**Penalty for Catching Hold of a Tramcar.**—A cyclist was summoned at Lambeth for catching hold of the side of a tramcar ascending Dog Kennel Hill, East Dulwich. A police constable informed him that one section of the Police Act, 1839, provided that any person who caused himself to be carried or drawn by any carriage within the Metropolitan police district without the consent of the driver was liable to a fine of not more than 5s. Mr de Grey dismissed the summons on defendant paying costs.

**Portsmouth Tramway Extension.**—The new extension from South Parade Pier, through St. Helen's Parade and Festing Road, to Highland Road, Eastney, forms an important link in the local tramway system. It was opened on July 31 by the Mayor, Alderman J. H. Corke, J.P., who drove a car over the new section. The Mayor was accompanied by members of the Tramways Committee and various officials of the Corporation, including Mr. V. B. Lironi, electrical engineer, and Mr. W. R. Spaven, general manager.

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**Opening of a York Extension.**—Colonel von Donop, chief inspecting officer of the Board of Trade, on July 30 inspected the tramways extension from Blossom Street to South Bank, and the new line was put into service later in the day. The new route, which is little more than a mile in length, will serve the populous districts of South Bank and Bishopthorpe Road, and will provide a new route to the racecourse.

**The Punishment of "Joy" Riders.**—The Divisional Court of the King's Bench have dismissed an appeal by the father of a lad named Radley against a decision in favour of the London County Council at Westminster County Court. A car conductor mistook Radley for one of the boys who annoyed him by "joy" riding on the car, and cuffed him. The boy fell, and it was stated that the conductor fell on him and broke the boy's arm. A claim was made, and the County Court judge held that the conductor was not acting within the scope of his employment, and non-suited plaintiff.

**London Tramway Stoppage.**—The London County Council tramway system was seriously disorganised on August 1, owing to a mishap to a steam lorry in Kennington Park Road. About 8 p.m. a lorry and trailer were crossing the lines between the "Horns," in Kennington Gate when the steering gear broke and one of the front wheels came off. The vehicle eventually blocked the tramway lines and hundreds of cars in the Clapham, Brixton and Kennington Roads were brought to a standstill, the congestion extending as far as the Elephant and Castle. Cars were despatched by round-about routes, but it was an hour before the lines were clear.

**Western Valleys Railless Traction.**—The Unopposed Bills Committee of the House of Lords on Wednesday passed the Western Valleys (Monmouthshire) Railless Traction Bill. One awkward point was solved by the Committee. The local authorities are given power to purchase the undertaking at some future date, and the routes will pass through the districts of three local authorities. The three must agree to buy before a purchase can take place, and the promoters were afraid that they would be involved in three arbitrations for fixing the price. The Committee inserted a provision in the Bill to the effect that there should be only one arbitration.

**Illuminated Car at Oldham.**—Mr. J. W. Dugdale, general manager of the Corporation tramways, made application last week to the Electricity Committee for the free supply of current used by the illuminated car which was run on the occasion of the recent royal visit. The cost of the current was £8 7s. 9d., and it was pointed out that the Tramways Committee had spent a large sum on the equipment of the car. Considerable opposition was raised to the proposal, as some of the Electricity Committee considered that the Tramway Committee made money out of the special car by charging higher fares for a journey in the car which followed it. Eventually the application was granted.

**Southend Tramway Extension.**—Major Pringle, on behalf of the Board of Trade, on July 30, inspected and passed the first portion of the new boulevard tramway route at Southend. This portion is three-quarters of a mile long. The whole scheme embraces a mile and three-quarters, and gives access to the Thorpe Bay area, which is being rapidly developed. The total cost of the scheme is about £30,000, half of which is required for road making. A roadway 100ft. wide is being cut through from Southchurch to Thorpe Bay, and in the centre of this road 16ft. are set apart for the tramway tracks. The tracks will be laid on Jarrah wood sleepers, and on each side there will be a bed of shrubs and trees. The work is expected to be completed by next spring.

**Edinburgh Tramway Strike.**—It is estimated that the company lost about £10,000 in receipts during the recent strike, which continued for twelve days, and which, as reported in our last issue, was settled on July 31, as a result of a conference presided over by the Lord Provost. The *Edinburgh Evening Despatch* observes that it is satisfactory that the "settlement was arrived at without the meddling interference of busybodies, who would eagerly make use of such an unfortunate dispute in order to make personal or political capital." The *Scotsman*, in an editorial on the conclusion of the strike, expresses the hope that its moral—the "superiority of peaceful discussion and negotiation over the violent methods of the demagogue and the agitator—will not be lost on the working classes of this and other centres of population."

**Double-Deck Railless Car for Brighton.**—Brighton Council have informed Hove Corporation that a double-deck trolley car has been officially submitted to the Board of Trade for use on the under-running railless trolley system to be installed in Brighton. The communication adds that the Council do not assent to the view that a double-deck car is essential to the success of the scheme. The Hove General Purposes Committee have referred the letter to the Traction Committee with instructions to consider the system of overhead equipment submitted therewith, and report thereon, particularly as to whether such system is that most adapted for use in Hove and with double-deck cars; with power to take expert advice and view any systems at work. No official communication has been received from the Board of Trade with respect to the use of double deck railless cars which the Brighton Tramways Committee desire to adopt for their railless service. It was expected that the agenda for the Brighton Corporation's meeting for July would contain an intimation that tenders would be invited for the construction of the line on the Preston route, but these were withheld owing to the absence of any authority for the use of the double deck omnibus. It is understood that the Corporation is anxious to proceed with the work, and that this has been repeatedly intimated to the Board of Trade.

**Municipal Tramway Authorities' Influence in Parliament.**—In a report presented to the London County Council on July 22 the Parliamentary Committee refer to the deletion of clauses inserted in the Council's Bill by a Committee of the House of Commons, giving compulsory running powers to the London United Tramways Company over certain lines to be purchased by the Council. The Committee add:—"We feel that the success which has attended the Council's action in this matter is very largely due to the efforts of the members who spoke on behalf of the Council. Valuable assistance was also rendered by many of the local authorities owning tramway undertakings throughout the country." The report also takes note of Sir Ivor Herbert, the chairman of the Select Committee, withdrawing his opposition to the deletion, as it would leave the way open for fresh consideration and a chance of a satisfactory settlement.

**The Leeds Manager to Assist Bristol.**—When the minutes of the Tramways and Electricity Committee were submitted to the Leeds City Council last week, it was recorded that the chairman, Alderman C. F. Tetley, had given permission to the general manager, Mr. J. B. Hamilton, to render assistance to the Corporation of Bristol in connection with the projected purchase of tramways. One of the members desired to ask a question, but Alderman Tetley said that this was a matter entirely within his sphere. He had given the permission, and he maintained that it was not a part of the Council's duty to discuss it. The Lord Mayor thereupon ruled the question out of order. The Town Clerk said that the same subject was brought up two months ago, and the Lord Mayor then ruled the discussion out of order. On referring again to the agreement entered into between the Corporation and Mr. Hamilton, the Town Clerk now said that the Lord Mayor was quite right.

**Extraordinary Traffic at Manchester.**—The number of tramway passengers in Manchester on the occasion of the recent royal visit amounted to 825,703, the receipts constituting a record, with the exception of August 3, 1908. On that Bank Holiday the receipts were £4,144, and the passengers 698,013. Mr. J. M. McElroy, the general manager, has explained that the reason why the receipts were lower, although the number of passengers was higher, is due to the fact that there had been considerable reduction in the fares throughout the service, and consequently more passengers have to be carried to secure the same receipts. The figures for Monday, July 14, when the King visited Manchester, are the more remarkable, because for several hours during that day traffic in the centre of the city was stopped entirely, and 110 cars were engaged in carrying school children to special stands. The number carried on that day was more than the entire population of Manchester, which, according to the last census return, was 714,333.

**New Electrical Station at Glasgow.**—At the last meeting of the City Council it was decided to authorise the engineer of the electrical department and a member of the committee to visit the United States and Canada for the purpose of inspecting the largest electrical installations in operation there. The visit was considered advisable in view of the necessity for providing a new electrical generating station for the city. Bailie Smith, of the Electricity Committee, said that they had a big problem in hand, and they were acting on the principle that a thing well begun was half done. They had bought the best piece of ground for the purpose in the whole city at a price one fourth less than was paid for either of the two stations belonging to this Corporation. One of the greatest electrical authorities, Dr. Ferranti, had advised them before they did anything in Glasgow to visit America. Those responsible for the spending of over a quarter of a million wanted to learn every detail in which they could economise. Bailie Smith said that no consulting engineer would be employed on the new station; their new staff were quite capable of acting as consulting engineers.

**Unremunerative Fares in London.**—One of the provisions of the Bill which the London County Council have promoted in Parliament would have allowed them to charge up to a maximum of one penny per mile over their whole system, and any fraction of a mile may be deemed a mile. Giving evidence in support of the proposal, Mr. Fell, chief officer of the tramways, stated that if the Council got the power they sought, they did not propose to charge the maximum fares. They were now the cheapest carriers in the London area, and they had halfpenny fares and very cheap workmen's fares on all their sections. As an example of this, he gave the instance of a 19-mile ride for twopence from Tooting to Hop Exchange and back. When the Bill was before the Select Committee of the House of Lords, it was pointed out that in the districts of Acton, Chiswick and Shepherd's Bush passengers could now ride from 3½ to 5 miles for a penny, and the Council's proposal might interfere with the through running on the London County Council lines and the London United Tramways. Ultimately, it was announced that an agreement had been arrived at, under which the existing rates would not be altered, and the Committee decided that it might proceed.

**Contract and Transfer Tickets.**—Mr. C. W. Mallins, general manager, Liverpool Corporation tramways, has reported to the Committee that he had communicated with the principal tramways undertakings regarding the use of contract tickets, but he found that none of the 84 from which replies were received, with three exceptions, issues them. All consider that such tickets are impracticable owing to the difficulty, if not impossibility, of appraising the correct value of a contract on any large tramway system, and, further, the impossibility of effectually preventing fraud and abuse. Mr. Mallins is only aware of three undertakings where contracts have been introduced—Southport, Blackpool, and Aberdeen. At Southport the Corporation found it necessary to discontinue the use of contracts at the end of last year owing to

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the manner in which they were abused, and the consequent serious financial loss, while in the case of Blackpool it was estimated that the Corporation was losing £1,500 per annum. Out of 84 tramway authorities communicated with 48 issue no transfer tickets, considering that to do so would open the door to various kinds of abuse; 24 issue transfer tickets, but cannot recommend their adoption, owing to the fact that they lend themselves to all kinds of fraud; seven see no objection to the use of transfer tickets, while five others issue them on a very limited scale. With reference to the question of cheap fares for children there is no uniform practice adopted by the various tramways authorities; each authority seemed to arrange its fare in accordance with local conditions.

**Theft by Bogus Tramwayman.**—An audacious robbery was committed in Leeds early on August 2, when a box containing £60 in gold, silver, and copper was taken from an employée of the City tramways. The employee had left the Chapeltown depôt shortly after 7 o'clock with the box, and on arriving at City Square proceeded to the tramway offices. According to accounts in local newspapers, when the tramway man reached the middle of the roadway, another young man, wearing the cap of a tramway employée, hurried up to him and remarked in a matter-of-fact way, "You have to go back to the depôt for some boxes. Be quick; they're waiting for you. I'll take this bag to the office." The employée had not the slightest suspicion that the man was not connected with the tramways department, and he handed the bag over without a word and at once set off back to Chapeltown. The thief walked coolly towards the tramway offices, but instead of entering, turned up a side street off Infirmary Street and without waiting to get further afield ripped the thick leather bag open with a sharp knife or a razor, and proceeded to sort out the contents. He appears to have picked out only the gold coins, discarding the heavier silver and copper as being likely to jeopardise his chances of escape. He obtained £20 in gold and then cleared off, leaving £40 in silver and copper still in the bag, which he threw into the roadway. The whole of this amount, together with the damaged bag, was subsequently recovered by the tramways department. The robbery was only discovered when the man in charge of the money arrived at Chapeltown and learned to his amazement that no message had been sent for him and that he was not wanted. It then occurred to him that he might have been the victim of a theft, and he returned with all speed to the offices in the city and made his story known. The police were immediately informed, but the man was not captured.

## CONTRACTS AND ORDERS.

**Mr. G. F. Tomlinson** has received a contract for doubling tramways at Derby, at £2,632.

**Bayliss, Jones and Bayliss, Ltd.,** have an order for tie-bars from Salford Corporation tramways.

**The Electric Construction Company, Ltd.,** have received an order for a booster from Bolton Corporation.

**Walter Scott, Ltd.,** are supplying steel rails and fishplates for re-laying the track in Manchester Road, Bolton.

**Doncaster Tramways Committee** have accepted the tender of Arnold and Son, at £2,524, for extending the car shed.

**The United Electric Car Company, Ltd.,** have received an order for two top deck covers for tramcars from Lancaster Tramways Committee.

**Crompton and Company, Ltd.,** are supplying a direct current switchboard at Salusbury Road sub-station for the Willesden District Council.

**The Belfast Tramways and Electricity Committee** has accepted the tender of Bertram Thomas, of Manchester, for a switchboard panel for the electricity works.

**Burnley Corporation Electricity Committee** have accepted the tender of the British Westinghouse Electric and Manufacturing Company for a turbo-alternator, rotary converters, switchgear, etc., at £12,860.

**The British Insulated and Helsby Cables, Ltd.,** have a contract from Burnley Corporation for the supply of cables. They are also supplying 6,000 volt overhead three-phase line to Halifax Corporation.

**Bradford City Council** has accepted the following tenders as extensions of, and at the same prices as, existing contracts:—Siemens Brothers Dynamo Works, Ltd., 100 tramway motors, 50 resistance sets, and 100 circuit breakers; Dick, Kerr and Company, Ltd., 100 D.B. form K4 tramway controllers; Hurst, Nelson and Company, Ltd., 50 tramway trucks; Cole, Marchant and Morley, 50 power brake sets; Collier Brothers, 30 miles 0000 grooved copper trolley wire.

## PERSONAL.

**Lord Montagu of Beaulieu** has been appointed a member of the Road Board in place of the late Sir Charles Rose.

**Mr. H. F. Ellis,** electrical engineer, of South Shields, has been granted an increase in salary of £50, to £450 per annum.

**Mr. J. W. Dawson,** city surveyor of Bradford, has been voted an increase in salary of £100, and a further addition of £50 next year.

**Mr. J. H. Cowell,** general manager of the Blackburn Corporation Tramways, has been voted by the General Purposes Committee an increase of salary from £400 to £500 by four annual increases of £25.

**Mr. R. S. Pilcher,** general manager and engineer of Aberdeen Corporation Tramways, was, at a meeting of the Town Council on Monday, granted an increase of salary from £400 to £450, with further annual increases of £25 to £500.

**Mr. James Dalrymple,** general manager of the Glasgow Corporation Tramways, and Mr. Thomas Nisbet, master of works, sail for New York to-day by the Anchor liner *Camerenia,* with the object of studying American tramway methods.

**Mr. L. C. F. Bellamy,** borough electrical engineer and tramways manager of Ilkeston, has been presented by the employées of the tramways and electricity departments with a pair of handsome copper curbs and fire appliances, on the occasion of his marriage.

**Mr. J. W. Cockrill,** borough engineer, Great Yarmouth, was presented with a silver bowl during the recent conference of the Institution of Municipal and County Engineers in that town by the members of the Corporation and his brother officers in recognition of his election as President of the Institution.

**Mr. George Webster,** who has been appointed general manager of the Rochdale Corporation Tramways, will receive a salary of £350 per annum, rising by two annual increases of £25 to £400. Mr. F. Ogden has been appointed chief clerk, Mr. Richard Bentley chief traffic assistant, Mr. Sidgwick rolling stock superintendent, and Mr. George Philipson overhead equipment superintendent.

**Mr. G. M. O. Scott,** who was selected by the directors of the Ceará Tramway, Light, and Power Company as general manager, is now in Ceará acting as manager for the existing mule tramways during the construction of the new undertaking. He is also employed by the contractors in connection with the latter work, in order to preserve as far as possible, continuity in the technical and business management of the company. It was reported by Mr. C. Hunt, who presided at the annual meeting, that the works were proceeding satisfactorily, and that indications were that the receipts would be much more than was originally anticipated by the consulting engineers.

**Mr. T. B. Goodyer,** general manager, Croydon Corporation tramways, has on several occasions received commendation for the work he has accomplished for the tramway undertaking against the competition of the motor omnibuses. In 1909-10 the latter vehicles were inferior to those now in use, and on the London tramways being extended to the Croydon boundary the omnibuses gave up the fight. Now the vehicles of the London General Omnibus Company, the British and M.E.T. Companies are working the main London and Croydon route under the direction of the first-named, while from East London the petrol-electric vehicles of Thos. Tilling, Limited, make further competition for the tramways. Councillor Denning, chairman of the Tramways Committee, in moving the adoption of the manager's report for the year 1912-13 at the July meeting of the Council, remarked that Mr. Goodyer started the document by saying he had great pleasure in submitting the annual report. Mr. Goodyer might have said he had pleasure and pride in submitting it. The report did him very great credit. He doubted if a more exhaustive or a more reasonable report, dealing with the matter from every point of view, had been presented to that Council. No man could be more receptive of ideas, more interested in his work or more desirous of doing everything he could for the department than Mr. Goodyer.

## FINANCIAL REPORTS AND MEETINGS.

**The British Electric Traction Co.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended August 1 amounted to £54,611. Upon such of the lines as were working both last year and this year the receipts show an increase of £3,693 upon the week.

**Increased Prosperity at Salford.**—The annual report of the general manager of the tramways, Mr. G. W. Holford, shows that the number of passengers carried was 50,113,120, as compared with 48,720,788 in the previous year. The receipts were £259,704, an increase of £6,389, and the mileage covered was 5,854,830, an increase of 46,461. The earnings per car-mile were 10.645d., and the energy consumption 1.60 units per car-mile, an increase of .02, attributed to the addition of 20 covered bogey cars. The gross profit was £99,766, to which must be added the sum of £5,659 for interest on investments, etc., making a balance of £105,426.

**Bournemouth and Investment of Renewals Fund.**—In his report on the tramways undertaking the borough auditor says that when a transfer to renewals fund has been made, it is incumbent upon them, pursuant to the Corporation Act, 1901, to invest such funds in authorised securities. Having regard to this provision the transfer to renewals fund has not, it would seem, been carried out in the manner enjoined by the statute. The auditor also refers to the importance to be attached to the early establishment of a reserve fund to which they have already given their attention. The net profit of £10,321 for the past year has been transferred to the renewals fund.

**Lanarkshire Tramways.**—The general meeting was held in London on July 31, when Mr. A. R. Monks, chairman of the board, who presided, in moving the adoption of the report, said that the traffic receipts for the half-year showed an increase of £6,314, and the expenses an increase of £3,182 as compared with the receipts and expenses for the corresponding half-year of 1912. He referred to the action of the Lanark County Council in proceeding with the construction of tramways from Uddingston to Bellshill, Mossend, and New Stevenston. Part of these would be in operation by the end of August and the remainder by the end of October. The report was adopted.

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**Perth Electric Tramways.**—An extraordinary meeting of the Perth Electric Tramways, Limited, was held on August 1, when the special resolution was confirmed that the company be wound up voluntarily. Mr. Oliver Wethered presided. Mr. Charles Wren and Mr. Frank Holyfield, of 30 and 31, St. Swithin's Lane, E.C., were appointed liquidators for the purpose of winding up the company. Mr. E. King proposed a hearty vote of thanks to the directors. They had proved themselves to be keenly alive to the best interests of the shareholders by accepting the offer of the Government to purchase their undertaking, and they might congratulate each other upon the result.

**Manaos Tramways and Light Company.**—The tramway receipts amounted to £106,148, and the lighting to £44,148, against £109,718 and £35,602 respectively for the previous year. The result of the company's operation for the year is a surplus, after meeting debenture interest and sinking fund, of £28,107, which compares with £16,318 for the previous year. During the year under review £21,509 has been spent on capital account, the principal items being the four new cars and certain additional track work required by the concession. To the above-mentioned balance of £28,107 must be added the amount brought forward from the last account, making a total of £31,435. The directors propose to transfer to contingencies reserve, making a total to the credit of this account of £15,725 (after writing off an amount of £4,274), £10,000; to transfer to renewals reserve, making a total to the credit of this account of £21,000, £6,000; to pay a dividend on £300,000 ordinary shares at rate of £4 per cent. per annum, leaving a balance to be carried forward to next year's accounts of £3,435.

**Kalgoorlie Electric Tramways.**—Mr. Allen H. P. Stoneham, chairman, presiding at the meeting of the Kalgoorlie Electric Tramways, Limited, on August 1, said that the accounts were not so satisfactory as could be wished, owing in a great measure to the depressed state of business in Kalgoorlie and to fewer men being employed in the mines. Wages were higher, and consequently while the receipts had gone down the expenses had gone up. The manager, Mr. Stanley, worked extremely hard, and was assidious in his service, but the position was very difficult owing to labour demands. Mr. Stanley was to be highly complimented on the way he had conducted the company's case before the Arbitration Court. They had expected that the Transcontinental railway would help them. The work had been commenced, but in a very half-hearted way, and so far it had not benefited Kalgoorlie. They had hopes that before very long the idea of nationalising everything would extend as far as Kalgoorlie, and the Government would make an offer to purchase the tramways in the same way as had been done at Perth.

**Brush Electrical Engineering Company.**—Mr. E. Garcke, who presided at the 24th ordinary general meeting on July 30, said that he regretted that the reorganisation scheme had not resulted in at least an equilibrium between the expenses and the receipts. If it had not been for the miners' and other strikes the result of the year's working would have been much better. They were engaged on contracts for the Admiralty at Portsmouth, Chatham, and Rosyth. In pursuance of the policy to keep abreast of the latest improvements in steam turbines, they had identified themselves with the Ljungstrom turbine, a Swedish invention, which had been very carefully worked out and tested. The first set of this type—a turbo-alternator of 1,500 h.p. capacity—was put in service a couple of months ago at the power house of the North Metropolitan Electric Power Supply Company. They had orders in hand and in immediate prospect for these machines, and were looking forward to a large demand for turbines of this size. On the rolling-stock side they had besides the usual standard lines of tramcars and trucks, railway passenger coaches and wagons, turned out considerable numbers of motor-omnibus bodies of different types, but principally for service in the metropolitan area. Practically the whole of the bodies on the blue M.E.T. omnibuses, which were now running on the London streets, were their make. This was a line of manufacture for which they were especially well-equipped, and in which they hoped to continue to do good business. The company were greatly indebted to the managing director (Mr. Broadhurst) and to all the staff for the extraordinary efforts which they were exercising to improve the position of the company.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended August 2 amounted to £261,875, or £20,131 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £96 11s. 3d. per track mile, an increase of £5 13s. 8d. per mile as compared with last year.


## AGENCIES WANTED.

Argentine merchant, of English family, first-class connection with the principal English railway companies in the Argentine, now in Europe for a few weeks only, wishes to meet merchants and manufacturers desirous of introducing their goods in the South American market, with a view of taking up their sole agencies. Write immediately to "Argentine," c.o. Agence Havas, 113, Cheapside, London.


## COPPER AND ALUMINIUM MARKET.

August 8, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, August 8. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 68 15 0 .. | 67 5 0 .. | 77 2 6 |
| ,, ,, (three months) .. .. | 68 15 0 .. | 67 5 0 .. | 77 2 6 |
| Electrolytic Copper—bars or ingots .. | 71 10 0 .. | 70 10 0 .. | 80 10 0 |
| Aluminium—bars or ingots .. .. .. | 86 10 0 .. | 86 10 0 .. | 77 0 0 |

## COAL MARKET.

August 8, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, August 8. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 .. | 25 6 .. | 22 6 .. | 23 0 |
| Best Seconds.. .. .. | 24 0 .. | 24 0 .. | 21 9 .. | 21 9 |
| Ordinary Drys .. .. | 21 0 .. | 21 0 .. | 20 0 .. | 19 6 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 0 .. | 19 0 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 17 6 .. | 17 6 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 .. | 21 0 .. | 17 6 .. | 19 0 |
| Best Seconds .. .. | 19 6 .. | 19 6 .. | 16 9 .. | 17 9 |
| Ordinary Drys .. .. | 16 6 .. | 16 6 .. | 15 0 .. | 15 6 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 15 0 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 6 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 3 .. | 15 9 .. | 14 9 .. | 11 6 |
| Best Seconds .. .. .. | 13 6 .. | 13 6 .. | 12 9 .. | 10 0 |
| Smalls .. .. .. | 10 0 .. | 9 6 .. | 9 9 .. | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Aug. 5 | £50,055 | £55,298 | 31 | £1,726,061 | +£150 887 |
| Auckland..... (23 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,963 |
| Ballarat and Bendigo | June 28 | 773 | 718 | 12 | 11,144 | — 170 |
| Bombay ..... Rs. | July 11 | 2,879 | 2,927 | 28 | 87,025 | + 3,318 |
| Brazilian St. Rly. Mlrs. | June | 40,854 | 48,882 | 47 | 496,129 | + 17,623 |
| Brazilian Traction..... | July 19 | 81,656 | 95,378 | 29 | 2,635,490 | + 378,635 |
| Brisbane ..... | July | 23,080 | 26,205 | 30 | 177,208 | + 46,494 |
| British Columbia .....§ | June | 498,308 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | June | 5,985 | 6,249 | 26 | 89,560 | + 1,961 |
| Buenos Aires Lacroze... | July | 42,052 | 45,324 | 4 | 45,324 | + 3,272 |
| Calcutta.....Rs. | Aug. 2 | 60,192 | 63,944 | 31 | 19,64,302 | + 91,888 |
| Cape Town ..... | June | 11,076 | 11,560 | 26 | 75,483 | + 4,640 |
| Carthagena & Herrerias | July | 3,350 | 3,794 | 30 | 21,125 | + 6,942 |
| East India ..... | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie ..... | June | 3,351 | 2,854 | 26 | 17,226 | — 1,431 |
| La Plata..... | July | 3,592 | 4,770 | 30 | 36,342 | + 7,999 |
| Lima..... | June | 32,175 | 31,200 | 26 | 198,227 | + 8,110 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | July 31 | 25,153 | 27,430 | 30 | 375,087 | + 28,058 |
| Melbourne ..... | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico .....§ | June | 558,355 | 588,780 | 26 | 3,265,540 | — 5,881 |
| Montevideo..... | July | 25,435 | 29,189 | 39 | 287,602 | + 23,745 |
| Para ..... | Aug. 3 | 3,947 | 3,831 | 35 | 142,212 | + 2,790 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | June | 2,974 | 3,268 | 26 | 21,871 | + 6,632 |
| Shanghai .....§ | July 30 | 20,570 | 31,200 | 30 | 686,152 | + 60,275 |
| Singapore .....§ | Aug. 2 | 10,208 | 12,044 | 31 | 363,327 | + 41,207 |
| Toronto .....§ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....§ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London..... | Aug. 2 | £4,503 | £4,142 | 31 | £155,494 | +£13,898 |
| City and South London | ,, 2 | 2,931 | 2,619 | 31 | 87,919 | — 8,110 |
| Liverpool Overhead..... | ,, 3 | 1,659 | 1,840 | 31 | 52,590 | + 4,107 |
| London Electric..... | ,, 2 | 12,020 | 11,760 | 31 | 433,740 | + 5,510 |
| Mersey ..... | ,, 2 | 2,089 | 2,155 | 31 | 69,271 | + 4,670 |
| Metropolitan ..... | ,, 3 | 16,592 | 16,624 | 31 | 521,355 | + 3,479 |
| Metropolitan District... | ,, 2 | 12,042 | 12,448 | 31 | 407,187 | + 16,507 |


# DICK, KERR & CO.,

**Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**


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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | July 30 | £1,560 | £1,863 | + £303 | 9 | £14,789 | + £642 |
| Ayr Corporation ..... | Aug. 2 | 462 | 595 | + 133 | 11 | 5,503 | + 282 |
| Bath Electric ..... | July 30 | 947 | 1,289 | + 342 | 31 | 28,384 | + 1,356 |
| Birmingham Corp. ..... | Aug. 2 | 10,510 | 11,410 | + 900 | 18 | 205,271 | + 14,448 |
| Blackburn Corporation | July 30 | 1,210 | 1,498 | + 288 | 18 | 24,066 | + 1,966 |
| Blackpool & Fleetwood | Aug. 2 | 1,485 | 1,899 | + 414 | 5 | 7,458 | + 674 |
| Blackpool Corporation | July 31 | 2,681 | 3,683 | + 1,002 | 17 | 31,403 | + 2,987 |
| Bolton Corporation ..... | Aug. 3 | 2,611 | 2,841 | + 230 | 18 | 49,373 | + 2,423 |
| Bournemouth Corp. ..... | ,, 6 | 2,846 | 3,528 | + 682 | 18 | 39,014 | + 3,893 |
| Bradford Corporation... | ,, 2 | 5,515 | 6,549 | + 1,034 | 18 | 107,643 | + 5,564 |
| Brighton Corporation... | ,, 3 | 1,309 | 1,594 | + 285 | 18 | 19,488 | + 224 |
| Bristol ..... | ,, 1 | 7,595 | 9,101 | + 1,506 | 30 | 239,316 | + 31,384 |
| British Elec. Traction— | | | | | | | |
| Airdrie ..... | Aug. 1 | 282 | 319 | + 37 | 31 | 10,400 | + 1,497 |
| Barnsley ..... | ,, 1 | 165 | 362 | + 197 | 31 | 8,241 | + 3,025 |
| Barrow ..... | ,, 1 | 478 | 598 | + 120 | 31 | 12,225 | + 708 |
| Birmg. & Mid. Joint— | | | | | | | |
| Birmingham Dist. ... | Aug. 1 | 961 | 1,007 | + 46 | 31 | 30,939 | + 1,385 |
| Dudley—Stourbridge | ,, 1 | 1,011 | 1,126 | + 115 | 31 | 28,631 | + 2,438 |
| South Staffordshire .. | ,, 1 | 940 | 1,034 | + 85 | 31 | 30,491 | + 2,215 |
| Wolverhampton Dist. | ,, 1 | 493 | 539 | + 46 | 31 | 15,719 | + 1,136 |
| Devonport ..... | ,, 1 | 583 | 594 | + 11 | 31 | 16,585 | + 167 |
| Gateshead ..... | ,, 1 | 1,090 | 1,549 | + 459 | 31 | 37,915 | + 6,548 |
| Gravesend & N'thfleet | ,, 1 | 221 | 257 | + 36 | 31 | 7,013 | + 792 |
| Greenock—P.Gl'sgow | ,, 1 | 1849 | 1,280 | + 351 | 31 | 26,375 | + 2,073 |
| Jarrow ..... | ,, 1 | 144 | 178 | + 34 | 31 | 4,417 | + 374 |
| Kidderminster ..... | ,, 1 | 129 | 149 | + 20 | 31 | 3,606 | + 105 |
| Merthyr ..... | ,, 1 | 219 | 243 | + 24 | 31 | 6,672 | + 734 |
| Metropolitan ..... | ,, 1 | 8,719 | 9,229 | + 510 | 31 | 276,200 | + 5,220 |
| Middleton ..... | ,, 1 | 362 | 436 | + 74 | 31 | 10,831 | + 637 |
| Oldham—Ashton..... | ,, 1 | 627 | 691 | + 64 | 31 | 19,003 | + 387 |
| Peterborough ..... | ,, 1 | 151 | 235 | + 84 | 31 | 5,231 | + 1,090 |
| Potteries ..... | ,, 1 | 2,035 | 2,141 | + 106 | 31 | 64,366 | + 7,288 |
| Rothesay ..... | ,, 1 | 468 | 696 | + 228 | 31 | 6,899 | + 534 |
| Sheerness ..... | ,, 1 | 66 | 63 | — 3 | 31 | 1,590 | + 102 |
| South Metropolitan... | ,, 1 | 862 | 886 | + 24 | 31 | 25,296 | — 529 |
| Southport ..... | ,, 1 | 346 | 442 | + 96 | 31 | 9,559 | + 590 |
| Swansea ..... | ,, 1 | 1,244 | 1,354 | + 110 | 31 | 38,044 | + 3,731 |
| Taunton ..... | ,, 1 | 60 | 52 | — 8 | 31 | 1,448 | + 98 |
| Tynemouth..... | ,, 1 | 351 | 475 | + 124 | 31 | 7,714 | + 668 |
| Weston-super-Mare... | ,, 1 | 269 | 386 | + 117 | 31 | 4,287 | + 667 |
| Worcester ..... | ,, 1 | 362 | 431 | + 69 | 31 | 9,377 | + 609 |
| Wrexham & District.. | ,, 1 | 117 | 143 | + 26 | 31 | 3,707 | + 357 |
| Yorks (Woollen) Dist. | ,, 1 | 1,050 | 1,234 | + 184 | 31 | 35,454 | + 2,571 |
| Burnley Corporation ... | ,, 2 | 1,504 | 2,488 | + 984 | 18 | 30,650 | + 3,941 |
| Burton-on-Trent Corp. | ,, 3 | 834 | 338 | + 4 | 18 | 5,144 | + 93 |
| Bury Corporation..... | ,, 3 | 1,289 | 1,449 | + 160 | 18 | 24,807 | + 736 |
| Cardiff Corporation..... | July 12 | 2,580 | 2,871 | + 291 | 15 | 40,016 | + 4,167 |
| Chatham and District.. | ,, 31 | 963 | 916 | — 47 | 30 | 27,040 | + 1,208 |
| Chesterfield Corp. ..... | ,, 31 | 319 | 393 | + 74 | 17 | 4,541 | + 545 |
| Colne & Trawden..... | Aug. 2 | 276 | 367 | + 91 | 31 | 8,363 | + 496 |
| Cork Electric..... | July 31 | 518 | 568 | + 50 | 30 | 14,906 | + 11 |
| Croydon Corporation ... | ,, 25 | 1,906 | 1,641 | — 265 | 16 | 27,914 | — 4,183 |
| Darlington Corporation | ,, 26 | 235 | 265 | + 30 | 17 | 4,224 | + 392 |
| Derby Corporation ..... | A g. 2 | 974 | 1,044 | + 70 | 18 | 17,638 | + 1,949 |
| Dover Corporation ..... | ,, 2 | 300 | 303 | + 3 | 18 | 4,357 | — 190 |
| Dublin & Lucan ..... | ,, 1 | 152 | 199 | + 47 | 4 | 845 | + 98 |
| Dublin United ..... | ,, 1 | 5,647 | 6,879 | + 1,232 | 30 | 181,848 | + 4,178 |
| Dundee City ..... | July 30 | 1,135 | 1,442 | + 307 | 11 | 14,702 | + 1,243 |
| East Ham Corporation | Aug. 2 | 1,054 | 913 | — 141 | 18 | 18,539 | — 510 |
| Exeter Corporation ..... | ,, 1 | 358 | 398 | + 40 | 18 | 6,164 | + 145 |
| Glasgow Corporation ... | ,, 2 | 17,887 | 18,449 | + 562 | 9 | 177,312 | + 12,414 |
| Glossop (U. Elec. Supply) | ,, 2 | 126 | 140 | + 14 | 31 | 3,948 | + 478 |
| Halifax Corporation ... | July 29 | 2,087 | 2,307 | + 220 | 17 | 37,023 | — 314 |
| Hastings & District..... | ,, 31 | 1,177 | 1,334 | + 156 | 31 | 28,849 | + 1,387 |
| Huddersfield Corp. ..... | Aug. 2 | 1,933 | 2,275 | + 292 | 18 | 38,475 | + 3,252 |
| Hull Corporation ..... | ,, 2 | 3,021 | 3,123 | + 102 | 18 | 54,688 | + 2,897 |
| Ilford U.D.C. ..... | ,, 2 | 516 | 442 | — 74 | 18 | 8,251 | — 1,468 |
| Ilkeston Corporation ... | ,, 6 | 137 | 165 | + 28 | 19 | 2,484 | + 499 |
| Ipswich Corporation ... | ,, 2 | 522 | 548 | + 26 | 15 | 8,269 | + 8 |
| Isle of Thanet ..... | ,, 2 | 1,424 | 1,540 | + 116 | 44 | 23,894 | + 581 |
| Kilmarnock Corp. ..... | ,, 2 | 164 | 266 | + 102 | 11 | 2,137 | + 133 |
| Lanarkshire ..... | July 31 | 1,409 | 1,545 | + 136 | 30 | 50,020 | + 6,530 |
| Lancashire United ..... | ,, 30 | 1,387 | 1,705 | + 318 | 30 | 44,917 | + 4,464 |
| Leeds City ..... | Aug. 2 | 7,814 | 8,565 | + 751 | 18 | 149,513 | + 9,444 |
| Leicester Corporation... | ,, 2 | 2,659 | 2,911 | + 252 | 31 | 85,794 | + 8,014 |
| Leith Corporation ..... | ,, 2 | 689 | 717 | + 29 | 11 | 8,524 | + 157 |
| Liverpool Corporation.. | ,, 2 | 12,395 | 13,657 | + 1,262 | 30 | 393,636 | + 28,017 |
| Llandudno & Colwyn B. | ,, 1 | 609 | 683 | + 74 | 35 | 9,807 | + 976 |
| London County Council | July 30 | 41,585 | 41,410 | — 175 | 17 | 731,738 | — 23,872 |
| London Gnl. Omnibus.. | Aug. 2 | 54,124 | 68,575 | + 14,451 | 31 | 1,917,637 | + 410,947 |
| London United ..... | ,, 1 | 6,589 | 7,000 | + 411 | 31 | 189,978 | — 1,965 |
| Lowestoft Corporation | ,, 2 | 435 | 383 | — 52 | 43 | 7,891 | + 254 |
| Maidstone Corporation | July 24 | 217 | 237 | + 20 | 17 | 3,423 | + 159 |
| Manchester Corp. ..... | Aug. 2 | 16,328 | 17,546 | + 1,218 | 18 | 317,396 | + 15,669 |
| Nelson Corporation..... | ,, 2 | 217 | 261 | + 44 | 18 | 3,833 | + 193 |
| N'castle-on-Tyne Corp. | ,, 2 | 4,367 | 4,890 | + 523 | 18 | 86,411 | + 6,947 |
| Newport (Mon.) Corp.... | ,, 2 | 733 | 831 | + 98 | 18 | 13,444 | + 816 |
| New St. Helens & Dist.... | July 30 | 793 | 936 | + 143 | 5 | 4,086 | + 498 |
| Northampton Corp ..... | Aug. 1 | 583 | 603 | + 20 | 17 | 10,273 | + 228 |
| Nottingham Corp. ..... | July 31 | 3,170 | 3,334 | + 164 | 17½ | 58,456 | + 1,748 |
| Oldham Corporation ... | Aug. 3 | 2,123 | 2,396 | + 273 | 19 | 41,804 | + 2,329 |
| Portsmouth Corp..... | ,, 2 | 2,505 | 2,804 | + 299 | 18 | 40,610 | — 142 |
| Preston Corporation ... | July 30 | 817 | 861 | + 44 | 17 | 15,012 | + 1,135 |
| Provincial ..... | Aug. 2 | 2,270 | 2,532 | + 262 | 44 | 78,677 | + 3,992 |
| Reading Corporation ... | July 31 | 678 | 727 | + 49 | 17 | 12,024 | + 578 |
| Rochdale Corporation | Aug. 2 | 1,589 | 1,788 | + 199 | 18 | 29,061 | + 690 |
| Rotherham Corp. ..... | ,, 6 | 837 | 1,214 | + 377 | 18 | 17,972 | + 4,735 |
| Salford Corporation ... | ,, 4 | 5,061 | 5,657 | + 596 | 18 | 95,698 | + 3 329 |
| Sheffield Corporation... | ,, 3 | 6,605 | 7,159 | + 553 | 19 | 137,719 | + 13,919 |
| Southampton Corp. ..... | July 30 | 1,353 | 1,453 | + 100 | 17 | 22,766 | + 487 |
| Southend-on-Sea Corp. | ,, 30 | 1,068 | 1,251 | + 183 | 18 | 15,940 | + 1,625 |
| South Shields Corp..... | Aug. 2 | 694 | 853 | + 174 | 17 | 12,927 | + 1,656 |
| Sunderland Corp. ..... | ,, 3 | 1,411 | 1,845 | + 434 | 18 | 26,076 | + 2,863 |
| Sunderland District .... | July 30 | 539 | 602 | + 63 | 33 | 20,938 | + 3,843 |
| Swindon Corporation .... | ,, 30 | 162 | 164 | + 2 | 17 | 2,794 | + 187 |
| Trys. (M.E.T.) Omn. Co. | Aug. 2 | ... | 8,008 | ... | 31 | 93,224 | ... |
| Tyneside Trys. & Tmrds. | July 30 | 531 | 579 | + 48 | 5 | 2,326 | + 38 |
| Wallasey Corporation | Aug. 2 | 1,234 | 1,453 | + 219 | 18 | 23,247 | + 1,628 |
| Walsall Corporation ... | ,, 2 | 601 | 639 | + 38 | 31 | 18,902 | + 1,279 |
| Walthamstow U.D.C.... | ,, 2 | 713 | 790 | + 77 | 18 | 13,520 | — 785 |
| Warrington Corp ..... | July 31 | 436 | 430 | — 6 | 18 | 7,897 | + 310 |
| West Ham Corporation | ,, 31 | 2,570 | 2,668 | + 98 | 17 | 48,319 | + 1,094 |
| Wigan Corporation ..... | ,, 31 | 1,323 | 1,452 | + 129 | 17 | 25,733 | + 2,800 |
| Wolverhampton Corp | Aug. 6 | 1,252 | 1,379 | + 127 | 19 | 20,369 | + 1,143 |
| Yorkshire (W. Riding) | ,, 3 | 1,562 | 1,559 | — 4 | 31 | 44,021 | + 4,543 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, August 8. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | — 2 | 77 — 80 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | — 1/16 | 4 11/16 — 4 13/16 |
| 5 | Do. 5½% Cum. 2nd Pref. | + 1/16 | 4¼ — 4½ |
| 100 | Do. 4% Deb. Stk. Red. | ... | 91 — 93 |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 94½ — 96½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 97 — 99 |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 — 102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | 7/16 — 9/16 |
| 1 | Do. 5% Cum. Pref | ... | 3/16 — 5/16 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 xd |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref. | + 1/8 | 10¾ — 11⅛ .. |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | — 1/8 | 86½ — 88⅛ xd |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 6⅞ — 7⅜ |
| 5 | Do. do. 5% Cum. Pref. | ... | 4⅜ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 97 — 100 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5¾ — 6 |
| 10 | Do. do. 4% Cum. Pref. | ... | 7 — 7¼ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 — 102 |
| 100 | Do. do. 4½% Deb. Stock | + 1 | 96 — 97 |
| 100 | British Columbia Elec. Ely. Co., Lim., Def. Ord. Stck. | + 1 | 124 — 129 |
| 100 | Do. Pref. Ord. Stock | ... | 109 — 114 xd |
| 100 | Do. 5% Cum. Perpetual Pref. Stock. | ... | 102½ — 105½ |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 100 — 102 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 — 102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. | ... | 95½ — 97½ |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | — 1 | 78 — 81 |
| 100 | Do. 7% Non-Cum. Pref. | — 1 | 37 — 40 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | — ½ | 7⅛ — 9⅛ |
| 100 | Do. Deferred Ord. Stock | ... | 3½ — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock. | ... | 90 — 98 |
| 100 | Do. 4½% Second Debenture Stock, Red | — 1 | 72 — 76 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 89 — 93 xd |
| 100 | Buenos Ayres Lacrose Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 98½ — 100½ |
| 5 | Calcutta Tramways Co., Limited. Ord. | ... | 5½ — 6½ |
| 5 | Do do. 5% Cum. Pref. | ... | 4 1/16 — 5 1/16 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., | ... | 11/16 — 13/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3½ |
| 100 | Do. 5% Debs. Red. | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5 1/16 — 5 3/16 |
| 100 | Do. 4% Debenture Stock Red, 1985 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ½ | 95 — 97 |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | 8 1/16 — 8 3/16 |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | + ¼ | 11¾ — 12 |
| 10 | Do. do. 6% Pref. | — 1/16 | 12 — 12 |
| 100 | Do. do. "A" Red. | ... | 82 — 79½ |
| 100 | Do. do. Deb. Stock "B" Red. | ... | 79½ — 82 |
| 10 | Gateshead & Dist Trys. Co., Ord. | ... | 8½ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | 1/16 — 3/16 |
| 1 | Do. do. 6% Cum. Pref. | ... | 3/16 — 5/16 |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 8% Mort. Bds. (Regd.) | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. | ... | 3½ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. | ... | 6¾ — 7¾ |
| 100 | Do. do. 4½% Deb. Stock | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2½ — 2¾ |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 1/16 — 1/8 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 1 3/16 — 1 5/16 |
| 10 | Lanarkshire Tramways Co. | ... | 10 — 10½ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1 3/16 — 1 5/16 |
| 1 | Do. 6% Cum Pref. | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | 1/16 — 3/16 |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | + 1½ | 94½ — 96½ |
| 100 | Do. Do. 5% Cum, Inc. Deb. Stk. Red. | + 1 | 88 — 90 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | + 1 | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 — 103 |
| 5 | Do. do. 6% Cum. Pref. | ... | 4½ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 86½ — 89½ |
| $100 | Manila Electric R. R. and Lighting Corp. Capital Stk. | ... | 107 — 110 |
| $1,000 | Do. do. 5% Bds. | ... | 99 — 101 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 1/16 — 1 1/16 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 84 — 88 |
| 100 | Do. 5% Deb. Stock, Red. | — ½ | 91 — 94 |
| $100 | Mexico Tramways Co., Common Stock | + 2 | 90 — 93 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 87 — 90 |
| 100 | Do. 6% 50-yr. Mort. Bonds | + 1 | 87 — 90 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | — 1 | 91 — 93 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 97 — 99 xd |
| 100 | Do. 4½% Sterling Debs, (1932) | ... | 98 — 100 |
| 1 | National Steam Car Co. Ltd. | + 1/16 | 1 1/16 — 1 3/16 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 6½ — 6¾ |
| ... | Do. do. 5% Cum. Pref. | ... | 6⅛ — 6⅜ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 6 — 6½ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4⅝ — 5 |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord. | ... | 1½ — 1¾ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 29/32 — 31/32 |
| 1 | Do. 5% Cum Pref. | ... | 15/16 — 1 1/16 |
| 100 | Do. 4½% Debenture Stock, Red. | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim., Ord. | ... | 3/16 — 5/16 |
| 10 | Do. 5% 1st Deb. Stock | ... | 97½ — 100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 93 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st Mt. Debs. | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds | + ½ | 99½ — 101½ |
| 100 | 5% 50-yr. Mort. Gold Bonds | + 1 | 93½ — 95½ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | ... | 100 — 102 |
| 10 | Shanghai Elec. Construction Co. | ... | 8½ — 9½ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 85 — 89 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 1/16 — 3/16 |
| 100 | Do. do. 4% Deb. Stk. | ... | 63 — 68 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 94½ — 96½ xd |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 98 — 100 |
| 100 | Toronto Suburban Ely. Co., 4½% 1st Mort. Deb. Stock | ... | 88 — 88 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 89¾ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord. | + 1/16 | 4½ — 5 |
| ... | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 97 — 100 |
| 100 | Winnipeg Elec. Ely. Co. 4½% Perp. Cons. Deb. | ... | 98½ — 101½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. | ... | 3/16 — 5/16 |
| ... | Do. do. 6% Cum. Pref. | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 81 — 85 |

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

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# THE THURY MULTIPLE-UNIT TRAIN CONTROL SYSTEM

## AS APPLIED TO THE MARTIGNY AND CHATELARD RAILWAY.

*(Contributed.)*

The first practicable application of the Thury system of multiple-unit control was made on the Martigny-Chatelard Railway Company's line forming the Swiss section of the international line connecting La Valais and Chamounix. Experiments of a preliminary character were carried out in 1908-9, in the spring of 1910 the new system was embodied in definite shape, and during the summer seasons of 1910 and 1911 it was in practical everyday use. The thoroughly satisfactory and trustworthy results of these trials induced the company to decide on installing the apparatus throughout their system. This particular installation and the working conditions of the Martigny-Chatelard line are described in the first part of the present article. Fig. 1 shows one of the trains composed of a motor car and trailer fitted with the Thury multiple-control apparatus. Fig. 2 gives a view of the driver's platform on the motor car with the various details of the equipment, master controller, synchronising apparatus, and ordinary controller.

**Fig. 1.—Thury Multiple-Unit Control Train on Martigny-Chatelard Railway.**

The Martigny-Chatelard Railway presents the most unpromising conditions for the application of the multiple-unit control system. It is a mountain railway, forming the continuation beyond Martigny of the line from Fayet which leaves Chamounix and joins up to Chatelard. This portion of the line cannot be equipped, like the rest, with ordinary rolling stock forming trains of four or six carriages because it contains a section of rack railway with a slope of 1 in 5. This section is traversed only by trains consisting of a single motor car with or without a trail car, which latter must always be uppermost, by Government regulation, so that it is pushed up the slope and not hauled up.

As a consequence, on trains with no multiple-unit control equipment it is extremely awkward and difficult to carry out manœuvres at terminal stations, and more especially at the two wayside stations on the rack sections, as the line is single track. The introduction of the multiple-unit control system has overcome these difficulties, retaining the same composition of the trains, the same relative position of the cars, and considerably simplifying the four manœuvres necessary on each double journey.

As the rack section has to be traversed at a speed of 7 kilometres an hour, and the car has to pass on to it without any preparation on account of the gear which is used for adhesion at high speed, the motors have to be designed for the maximum power compatible with the metre gauge. They absorb 240 KW. (326 H.P.) per motor car at the reduced speed of 7 kilometres an hour, equivalent to 650 or 700 H.P. at 16 kilometres an hour (10 miles an hour). The controllers are designed to carry 400 amperes continuously at 650 volts normal load: the step from series to parallel, which is required at the end of the rack section on a slope of 1 in 14, is carried out without any shock or inconvenience whatever. Further, the descent on the steep slopes of the mountain track, especially the 1 in 5 slope of the rack section, is done entirely with the aid of the electric rheostatic brake with a remarkable range of speed, from 7 kilometres an hour on the 1 in 5 slope, to 18 kilometres an hour on the 1 in 14 slope and 22 kilometres an hour on the easier gradients.

To cope with these rigorous conditions, the controllers are made with 24 different positions to satisfy every requirement of this peculiarly difficult line. The train units weigh 56 tons (the motor car 38 and the trailer 18).

The distinctive feature of the equipment of the Martigny Railway is the Thury system of multiple-unit control. Hitherto the problem of control has been solved by the use of contactors which take the place of the contacts of the ordinary car controllers. These contactors are a kind of relay actuated by a master controller operated by the motorman of the train. This system is somewhat complicated, its weight is considerable, and it presents some difficulties

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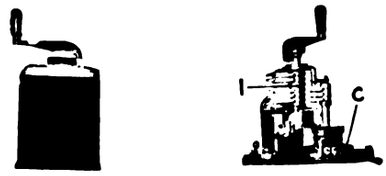
in the formation of trains owing to the number of connections to be made between each pair of cars.

To facilitate traffic operations, it is desirable to be able to make up trains in any order, and to drive the train from a trailer car as readily as from a motor car. The drawbacks of the contactor system are more marked when exigencies of traffic demand changes from a service of single motor cars to complete trains. It is then necessary to consider whether it is worth while to "scrap" the existing controllers or to adapt them to a contactor system.

What was wanted by the managers of the Martigny Railway was a means of control which would allow the existing controllers to be used and which would operate them at a distance simultaneously. This solution also limited the cost of alteration, preserved a simple general scheme, and avoided unnecessary addition to the weight of the equipment. Further, the system did not require the transmission of heavy currents in the flexible connections between the cars, and these currents were at a lower voltage than that of the line. These features, it is claimed, are satisfactorily realised in the system of multiple-unit control invented by Mr. Rene Thury, and manufactured by the H. Cuenod Manufacturing Company, Geneva, whose representative in London is Mr. C. Campart, of 49, Newgate Street, E.C. The application of this system allows of the making up of trains in any desired sequence, as the train can be driven from the platform of a motor car or a trailer car equally well, and the number of conductors necessary to connect up the cars is only three, and these transmit small currents at low voltage, the current strength being 1·6 amperes per motor car and the voltage between conductor and earth not more than 46 volts.

The principle of the Thury multiple-control system consists in synchronously operating all the controllers on a train of cars by means of small electric motors run by low-pressure current. A master controller works the sychronising mechanism by electric current from a small battery of 18 cells similar to those used for train lighting. The master controller is fixed on the platform of the car, and is operated by the driver of the train. The synchroniser is attached to the top of the ordinary controller and consists of the driving motor and synchronous mechanism. This system of control allows of a variable number of regulating steps; in the apparatus shown in the illustrations and used on the Martigny-Chatelard Railway there are 24 steps. The controllers are designed to carry a current of 400 amperes.




Closed. Open.

Master Controller.

Fig. 3.—Automatic Gear Operating Controller, which is shown Closed.

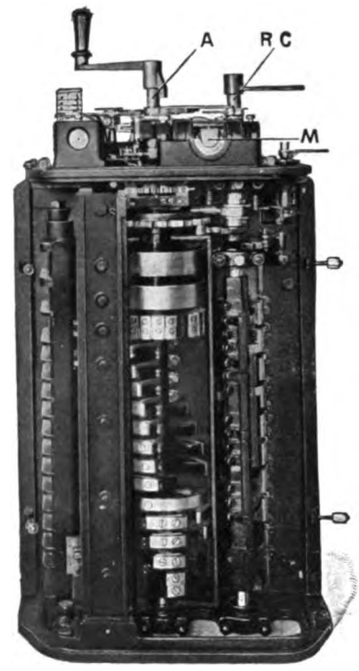
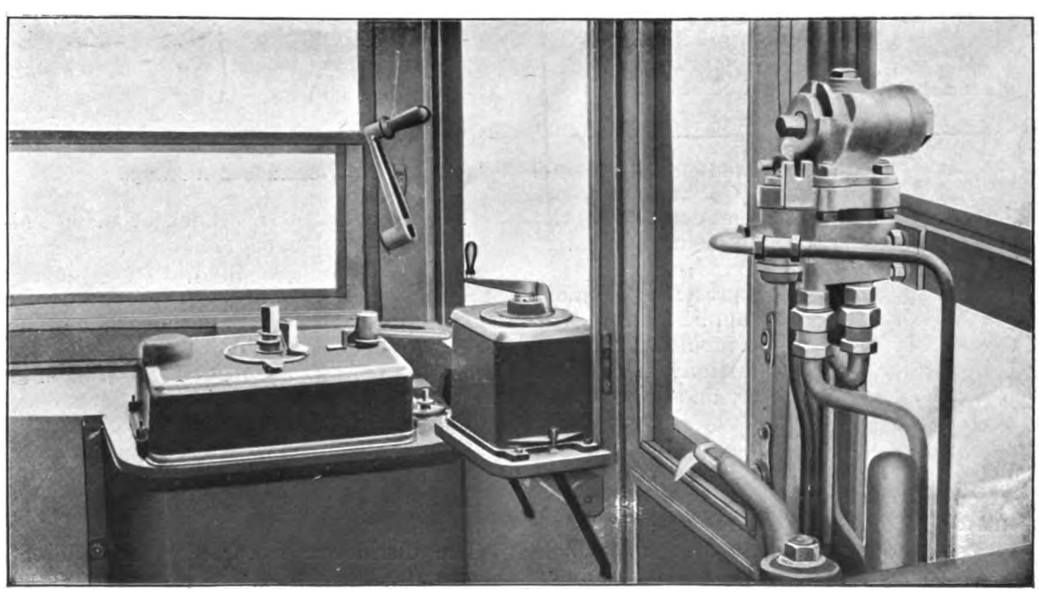



Fig. 4.—Automatic Gear (on top) Operating Controller (beneath).



Automatic Gear Operating the Controller. Master Controller.

Fig. 2.—Thury Control System on Motor Car of Martigny-Chatelard Railway.

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The ordinary equipment required for train driving consists of the following pieces of apparatus:

*For a Motor Car.*—Two master controllers, 2 controllers, 1 ten-way circuit breaker, 2 synchronisers, 1 accumulator battery, and in some cases 1 series-parallel switch.

*For a Trailer Car.*—One, or perhaps 2, master controllers, 1 accumulator battery, 1 ten-way circuit breaker.

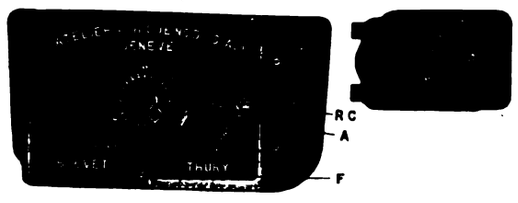


Fig. 5.—Top View.

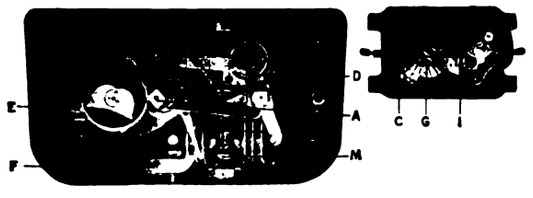


Fig 6.—Master Controller and Automatic Gear Operating the Controller.

The master controller, seen in open and closed positions in Figs. 2 to 6, is a small controller by means of which the driver runs the train. It has on its cover a dial giving all the positions of the main controller barrels, so that the driver can manœuvre it exactly as if he were operating the main controllers themselves, with this advantage, however, that the master controller being very light and having only a small current to transmit, the manipulation is made without any appreciable effort.

The master controller consists of a circuit-breaker (1) —Figs. 4 and 6—and a multiple-way switch (c) connected on one side to the three main control wires leading to the other cars and on the other side to an accumulator battery of 18 cells, two cells being between each contact or strip of the switch.

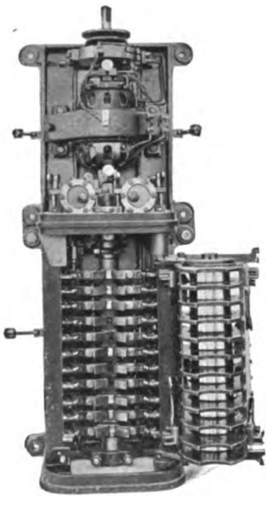

Fig. 7.—Series-Parallel Switch.

In using the master controller, the handle is first placed in position. This is done in two motions; the first closes the circuit-breaker inside the apparatus, and the second engages the contact arms of the multiple-way switch, which make connection between the master controller and the main control wires. The handle cannot be withdrawn until it is brought back to zero position, and this operation disconnects the three main control wires. The movement of the handle alters the position of the three arms of the multiple-way switch (c) and thus allows currents to flow in the three control wires, the sum of which currents, as in a three-phase system, is always zero.

It is advisable to make it a rule only to carry one driving handle on a train so as to avoid the risk of more than one of the master controllers being in circuit at the same time, as the apparatus is only "alive" when in use.

The synchroniser placed on the top of the main controller (Figs. 3 and 4) is shown viewed from above in Figs. 5 and 6. It consists of one motor, one tappet mechanism, and one synchronous transmission.

The little motor (M)—Fig. 6—by means of tappet gear, drives a toothed wheel, keyed on the end of the spindle (A) of the main controller barrel and having as many teeth as there are regulating steps. The supply current comes from an accumulator battery, and

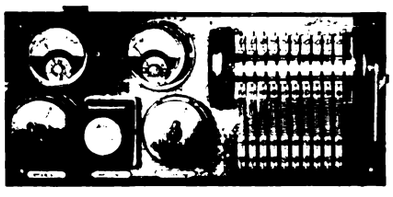

Fig. 8.—Ten-Way Circuit Breaker.

the motor is running all the time the train is in motion. While at work it absorbs about 100 watts, say 2·8 amperes at 36 volts.

The tappet gear placed between the motor (M) and the electro-magnet mechanism (E) allows the motor to drive the controller barrel either in one direction or the other or to leave it at rest, and consists of two tappets held up by two disengaging pawls. As soon as the driver, in starting the train, moves the handle of the master controller, he releases, by means of the synchronous transmission, a stud which holds back one of the pawls: the corresponding tappet thereupon engages in a notch of the toothed wheel and turns the barrel slightly. The movement of the pawl is effected by a stud, the displacement of which is due to the action of differential gear driven on the one hand by the motor and on the other hand by the controller drum in such a manner that the drum always tends to bring the stud back to its original position.

The synchronous transmission apparatus consists of an electro-magnet and a very light armature (E) mounted just like the rotor of an alternator, between its poles. The electro-magnet is excited by a current from the accumulator battery, and the armature is connected to the three control wires, which pass along the whole length of the train and through these wires to the master controllers on the car platforms.

As mentioned previously, the movement of the handle of the master controller shifts the three arms of the multiple-way switch, causing three currents, of which the sum is always zero, to flow in the three control wires. These currents act on the armature of the electro-magnet, holding it instantaneously in a particular position which remains the same as long as the three arms of the multiple-way switch in the master controller are stationary. Every movement of the handle, altering the position of these contact arms, is copied faithfully by the armature of the electro-magnet. However many sets of apparatus are in service the synchronism is always perfect. As soon as the position of the armature (E) is changed in one direction or the other one of the pawls is held up, the corresponding tappet engages in the toothed wheel and turns the controller drum the number of steps corresponding to the new position of the armature.

Every movement of the master controller in the hand of the driver is thus accurately reproduced in all the controllers in service. Any error in position of an armature which in any case cannot exceed one-twelfth of the circumference or 30 deg., would be immediately corrected by the tappet, which can only take up the position rigidly prescribed by the toothpitch of the wheel.

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*Working of the Synchronising Apparatus.*—As a natural result of the conditions above described, the driver, standing on any platform of the train provided with a master controller, can simultaneously command all the motor cars in the train, with absolute assurance that every movement of his hand is immediately transmitted to every controller barrel. As before mentioned, the master controller has on its cover a dial which shows the same steps and corresponding marks as on the ordinary controllers, so that the driver is always able to tell the position of the controller barrels. (See Fig. 5.) As a rule there is a master controller on both the front and rear platforms of each car, so that the train can be driven from the foremost platform, however it should be made up.

*Controllers.*—The motor cars are equipped with two ordinary barrel-type controllers of practically standard design, with a reversing barrel, permitting it to be used as an electric brake. With the unit-control system, the driver can always keep to his position at the head of the train; and it is not absolutely necessary to equip the motor cars with two controllers apiece unless one is wanted to act as spare. These controllers (Fig. 4) only differ from the ordinary type in the transition stage from series to parallel, which is carried out on a separate barrel. They are furnished with a handle to enable them to be operated by hand independently of the synchronous-control system. In this case a special key (F)—Figs. 5 and 6—puts the synchronous-control mechanism out of action.

To make a controller ready for service, it is only necessary to turn the reversing drum (EG)—Figs. 4, 5, and 6—to the forward or backward position by hand; the current will then flow in the little motor as well as the magnetic circuit of the synchronous apparatus. By the same action, the armature (E) is connected up to the three control wires which run the length of the train and are, in turn, connected to the master controllers.

*Series-Parallel Switch.*—This apparatus (Fig. 7) is designed to make the transition from series to parallel in one immediate step instead of five or six, as is usual. As the time required for these five steps would be a little longer with the control system than with hand operation, a slight retardation of the train would take place, causing a perceptible jolt on reaching the first parallel step, and this would be accentuated on a steep incline, say 1 in 15 for instance. This trouble is avoided by passing from series to parallel at a single step; it is done in about one-tenth of a second, and even on a steep incline the jolt is imperceptible. This arrangement offers another great advantage, namely, that the sparking, which in an ordinary controller takes place during the passage from series to parallel, is taken by the S.P. switch, where special precautions can be taken to extinguish it.

The switch is worked by a shunt from the 36-volt battery. The current only flows during the brief period of operation and is automatically cut off just before its completion. The switch is independent of the synchronous-control system proper, and works in the same way whether the controller is operated by hand or by transmission from the master controller. One series-parallel switch is enough for the two controllers of a motor car.

*Ten-Way Circuit-Breaker.*—This circuit breaker, shown in Fig. 8, is used for switching off all the supply circuit from the battery. It is furnished with resistances for keeping the momentary short-circuit currents set up in passing from one contact to the next on the master controller within proper limits. On the same panel are mounted the voltmeter and ammeter for the battery circuit.

In order to be able instantaneously to cut off the current to the motors in case of emergency, a fourth wire is added to the three control wires. This wire takes current from the battery to excite the coils of all the maximum cut-outs. The driver can in this way put every motor on the train out of action at any given instant. He has then only to bring the controller barrels to zero and lock the handle.

*Battery.*—The importance of the battery depends on what duty is required of it; it can be utilised for the magnetic brakes. If used for the synchronous control only, a battery of 18 cells is sufficient, the current necessary for the master controllers being 1·06 amperes per motor car, and three amperes per controller. The batteries are kept fully charged by a shunt current of about 2½ amperes, taken from the line through fixed resistance. The lighting circuit is used for this purpose. As may be seen, the capacity of the battery is of rather secondary importance as it is mainly a regulating device.

*Formation of a Train.*—Trains can be made up of any number of motor car units, with or without trailer cars; if the latter are equipped with master controllers on their platforms they can be put at the head or tail of the train, or in the intermediate positions at will. The driver usually stands on the foremost platform whether the car is a motor or a trailer, but he can equally well drive from any other platform if necessary.

The train can be quickly made up, because there is only a simple socket to connect besides the ordinary couplings. This socket carries three contacts corresponding to the three control wires (which are only at 36 volts potential difference from earth). A fourth contact enables all the automatic cut-outs to be tripped from any platform provided with a master controller.

## A HIGH-PRESSURE DIRECT-CURRENT ELECTRIC LOCOMOTIVE.

The high-pressure direct-current system of electric traction on railways is being gradually developed in various foreign countries, and as it is beginning to be tried in England considerable interest attaches to the designs employed abroad. Some electric locomotives which are being put into service on the Butte, Anaconda, and Pacific Railway in the United States are the first direct-current locomotives working at as high a potential as 2,400 volts. The railway in question has hitherto been worked by steam locomotives, and the conversion of part of it has been a large task.

The traffic demands on this particular railway are unusually severe, and consist principally of hauling long trains of copper ore over heavy mountain gradients. The 2,400-volt direct-current system was considered best suited for exacting service of this character; for its adoption presented an opportunity to realise unusual economies, both in initial expenditure and the cost of operation. The section of the road that has been equipped lies between Butte and Anaconda, Montana. It comprises 30 miles of main line single track, and numerous sidings, etc., aggregating a total of about 90 miles on a single-track basis. The haulage of copper ore, together with all mine supplies, lumber, etc., amounts to practically 5,000,000 tons of freight per year. Complete freight trains weighing 3,400 tons are made up of 50 loaded steel ore cars, and will be handled against a ruling gradient of 0·3 per cent. by a locomotive consisting of two of the units illustrated.

The initial equipment, consists of 17 locomotive units, type 0440-E-160-4 GE-229-A, 15 for freight and two for passenger service. Each unit weighs approximately 80 tons. The two units for forming the freight locomotives in each case will be coupled together and operated in multiple unit. The combination freight

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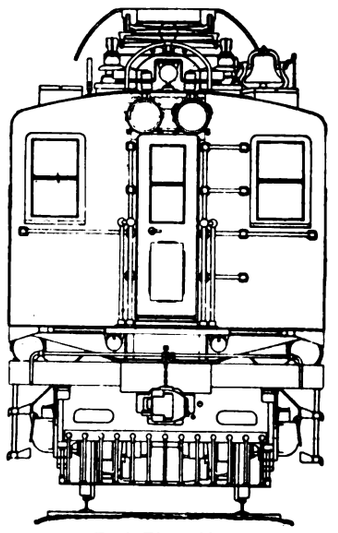
locomotives will haul the usual trains of 3,400 tons, at a maximum speed of 15 miles per hour against the ruling grade and at 21 miles per hour on level tangent track.

The passenger locomotives are of the same design as the freight locomotives, except that they are geared for a maximum speed of 45 miles per hour on level tangent track. A schedule of eight passenger trains



End Elevation.

per day, four each way, is maintained, the average train being composed of a locomotive and three standard steam railway passenger coaches. All the locomotive equipment, as well as the sub-station apparatus and overhead line material, were designed and built by the General Electric Company of America.

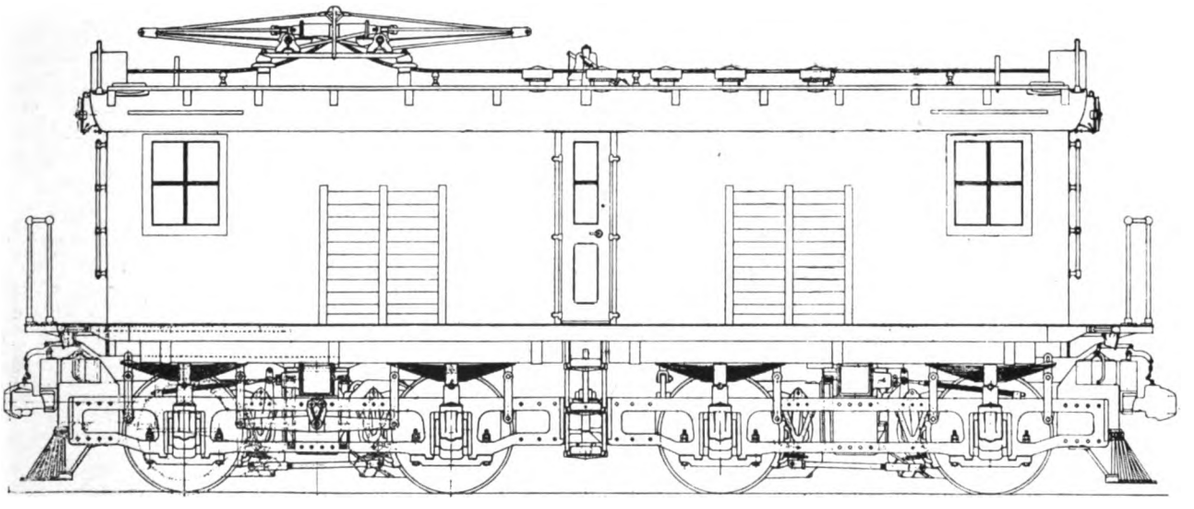
The locomotives are the articulated double-truck type with all weight on the drivers. The cab containing an engineer's compartment in each end and a central compartment for the control apparatus, is connected by end frames and a cast-steel centre transom. The entire weight is carried on semi-elliptic springs suitably equalised.

The engineer's compartment, at either end of the cab, contains the operator's seat, controller, air brake valves, bell and whistle ropes, ammeter, air gauges, sanders, and other control apparatus that should be within immediate reach of the engineer. In the central section is grouped the control apparatus. The contactors, reversers, and rheostats are mounted in two banks running lengthwise of the compartment. All parts and circuits carrying current at 2,400 volts are thoroughly protected from accidental contact. A dynamotor is employed to furnish 600-volt current for operation of the contactors, lights, and air compressor.

The principal data and dimensions applying to the locomotives are the following:

| | |
|---|---|
| Length inside of knuckles | 37 ft. 4 in. |
| Length over cab | 31 ft. |
| Height over cab | 12 ft. 10 in. |
| Height with trolley down | 15 ft. 6 in. |
| Width over all | 10 ft. |
| Total wheel base | 26 ft. |
| Rigid wheel base | 8 ft. 8 in. |
| Track gauge | 4 ft. 8½ in. |
| Total weight | 160,000 lb. |
| Weight per axle | 40,000 lb. |
| Wheels, steel tyred | 46 in. |
| Journals | 6 in. by 13 in. |
| Gears, forged rims, freight locomotives | 87 teeth. |
| Gears, forged rims, passenger locomotives | 80 teeth. |
| Pinions, forged, freight locomotives | 18 teeth. |
| Pinions, forged, passenger locomotives | 25 teeth. |
| Tractive effort at 30 per cent. coefficient | 48,000 lb. |
| Tractive effort at one-hour rating | 30,000 lb. |
| Tractive effort at continuous rating | 25,000 lb. |

The motors are of the GE-229-A commutating pole type, wound for 1,200 volts and insulated for 2,400 volts. A forged pinion is mounted on each end of the armature shaft and meshes into a corresponding gear mounted on the wheel hub. The gear reduction is 4·84 on the freight locomotives and 3·2 on the passenger locomotives. The GE-229-A motor is designed especially for



Side Elevation, 2,400-Volt Direct-Current Electric Locomotive.

carried by the two truck frames on centre pins. It is of the box type, extending the entire length of the locomotive, and is provided with end and side doors. On each axle is mounted a motor of the twin-geared type. The friction draft gear mounted on the outer end frame of each truck transmits the hauling and buffing stresses directly through the truck frame, diverting these strains from the centre pins and under frame. The trucks are built of heavy steel castings. The side frames are of a truss pattern with heavy top and bottom members and pedestal tie bars. They are

locomotive service, is enclosed and provided with forced ventilation. The method of ventilation circulates effectively a large volume of cool air throughout the motor and keeps all parts at a uniform temperature, eliminating the possibility of "hot spots." The continuous capacity of each motor is 190 amperes at 1,200 volts under forced ventilation, and 225 amperes at 1,200 volts for the one-hour rating. For the double-unit 160-ton locomotive this is equivalent to a continuously sustained output of 2,100 H.P.

The control equipment on the locomotives is the

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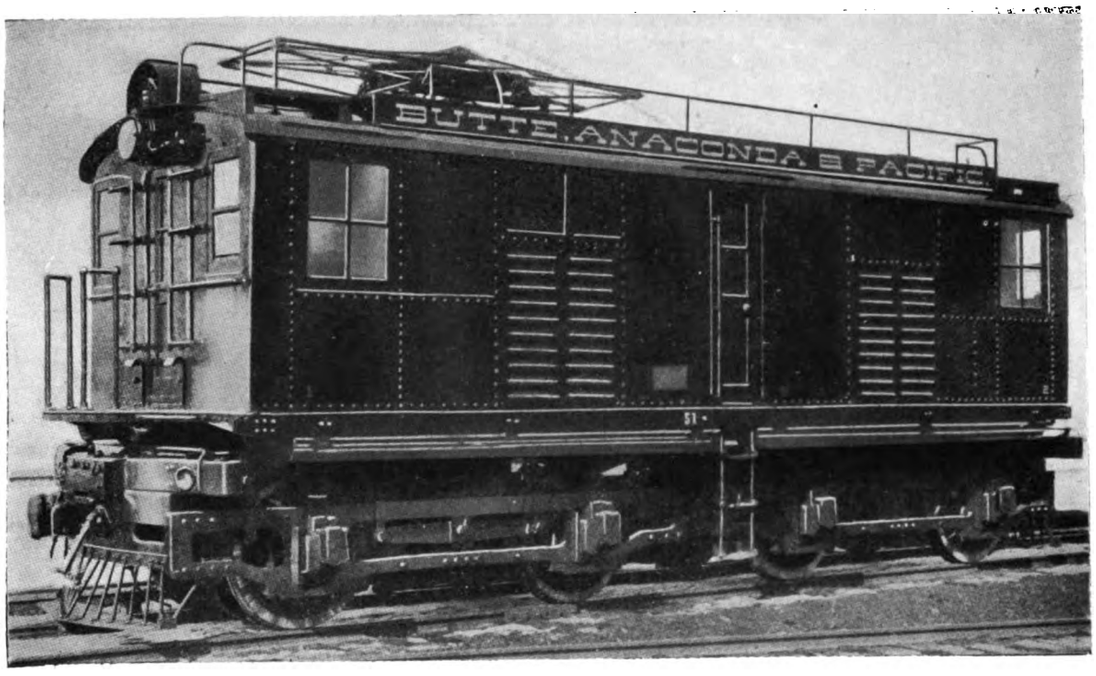
well-known Sprague-General Electric type M multiple-unit control, and is designed to operate the four motors in series and series-parallel. The pairs of motors with their respective resistances are all connected in series on the first point of the controller. The resistance is varied through nine points on the controller, and finally short-circuited on the tenth or running point. The pairs of motors are then operated similarly in series-parallel and all resistance is cut out on the nineteenth point, which is the full speed running point. The smooth transition between control points permits acceleration close to the slipping point of the wheels. A switch is provided having manually operated handles for cutting out either pair of motors, so that the locomotive can then be operated with one pair of motors in the usual way.

The contactors are actuated by the 600-volt circuit obtained from the dynamotor, and are of a design similar to that employed in the standard type M control. The principal variations are embodied in the method of insulating for the higher voltage. The main switch is provided with a powerful blow-out, so that heavy currents can be opened.

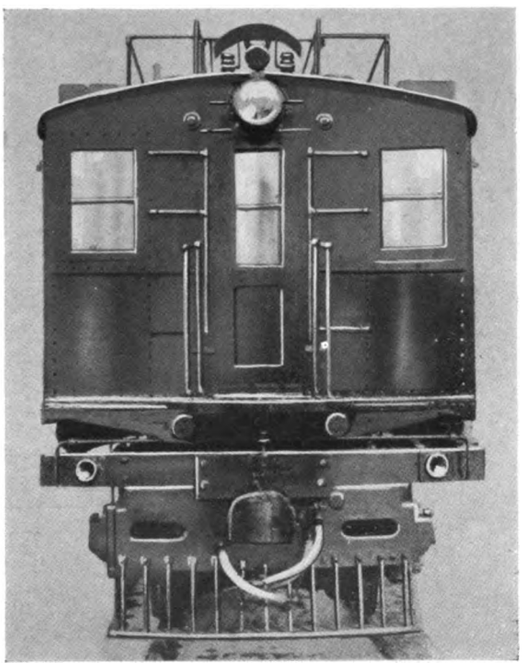
There are one main fuse for the trolley circuit and two fuses for the motor circuits. There is also an auxiliary circuit fuse for protecting locally the dynamotor and heater circuits. The main motor and auxiliary fuse boxes are provided with powerful magnetic blow-outs, energised by current passing through the fuse, to insure proper rupture of the arc. An ammeter is located at each engineer's position, and indicates the current in the circuit of one pair of motors. The main motor rheostats are formed of cast-iron grids assembled in a frame and insulated by mica. Twenty resistance units are provided for each passenger locomotive, and 26 resistance units for each freight unit.




2,400-Volt Direct-Current Electric Locomotive.

Current is collected by overhead trolleys of the pantograph type. They are pneumatically operated, and can be put into service from either engineer's compartment by a hand-operated valve. Each passenger locomotive is equipped with two collectors, and each freight unit with one collector. A 2,400-volt insulated bus line connected direct to the pantograph is run along the centre on the roof of the cab. The locomotives are equipped with arc head lights. The interior illumination of the cab is provided by ten incandescent lamps arranged in two circuits.

The air brakes are the combined straight and automatic type. The air compressor, the CP-26 type, is two-stage, motor-driven, and has a piston displacement of 100 cubic feet of air per minute when pumping against a tank pressure of 135 lb. per square inch. Pneumatic sanders are provided. All wiring is drawn through conduits and carefully protected.



End View of 2,400-Volt D.-C. Electric Locomotive.

**International Tramways Congress.**—The London County Council has decided to become a member of the International Tramways and Light Railways Union, which has its headquarters in Brussels. The annual subscription payable for the Council is £12. The chairman or vice-chairman of the Highways Committee will represent the Council at the next biennial International Congress of the Union, which will be held next summer in Berlin. The Congress has not met in London since 1902, the meetings having been held in various other European capitals.

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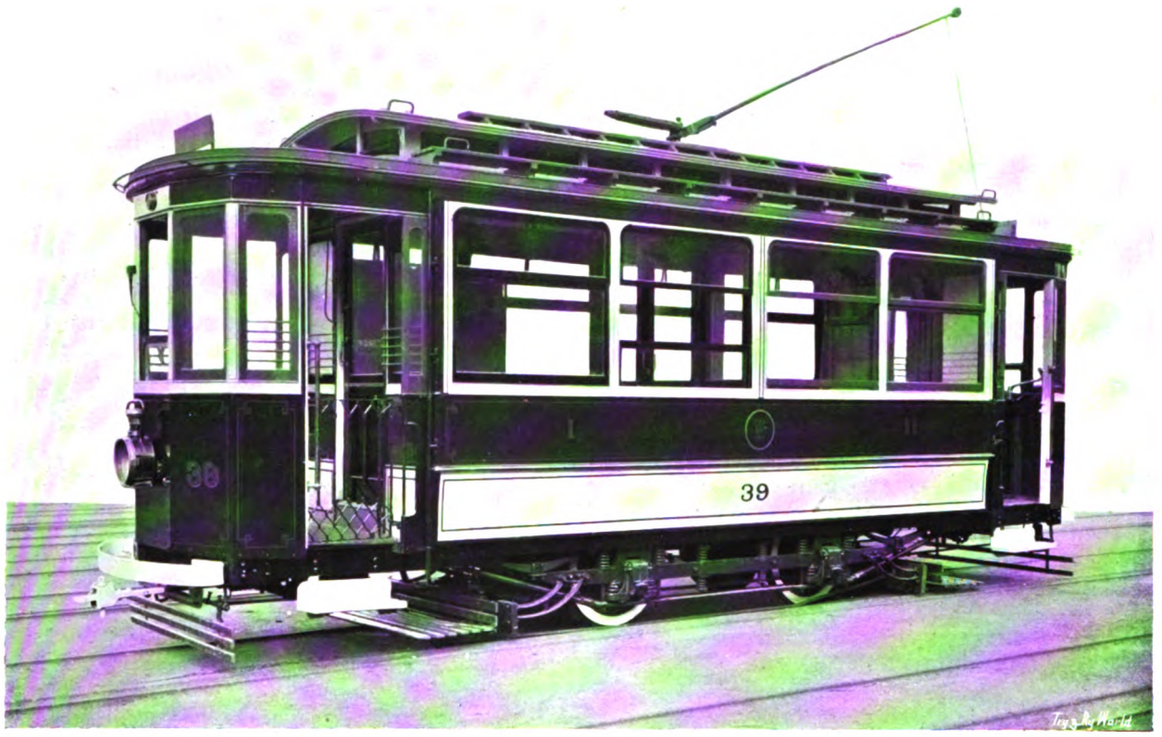
## NEW CARS FOR SALONICA.

Tramway business, like every other sort of civil enterprise, must no doubt have been greatly interfered with in Turkey and the Balkan States ever since the war broke out, but there is good reason for the belief that after peace is restored there will be a great development of business industry in that part of the world. By way apparently of anticipation of coming developments the United Electric Car Company, of Preston, have recently completed 12 motor cars for the Tramways et Eclairage Electriques de Salonique. Of these vehicles we are enabled to give the following description.




Exterior View of Car for Salonica.

The principal dimensions are:

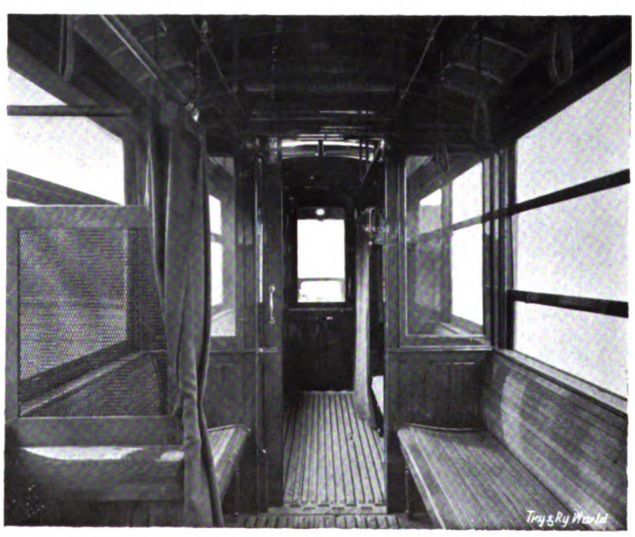
| | Ft. | in. | Mm. |
|---|---|---|---|
| Length of body over corner posts .. | 18 | $2\frac{13}{16}$ | 5,560 |
| Total length over all .. .. .. | 29 | $5\frac{7}{16}$ | 8,980 |
| Width over body .. .. .. .. | 6 | $8\frac{1}{4}$ | 2,040 |
| Clear height inside at centre .. .. | 8 | 6 | 2,592 |
| Wheel base of truck .. .. .. | 6 | 6 | 1,981 |
| Gauge .. .. .. .. .. | 3 | $3\frac{3}{8}$ | 1,000 |

Seating capacity, 22 passengers.

These cars, as will be seen by the accompanying illustrations, are of the closed single-deck type, and are mounted on a standard four-wheeled truck manufactured by the United Electric Car Company. The car bodies are divided into first and second-class compartments. The interior woodwork of the first class compartments is of polished mahogany, the ceiling being covered with lincrusta. The seats are upholstered in rattan. The interior woodwork of the second-class compartment is of varnished oak, the ceiling consisting of laths of ash with the roof ribs of the same material. The seats are of light oak laths.

In both compartments the seat on one side is of the longitudinal type. On the other side there is a longitudinal seat, and in the corner near the doorway there are two cross seats *vis à vis*. These cross seats are separated from the longitudinal seat by a trellis work of expanded metal, and can be isolated from the remainder of the compartment by hanging curtains, thus forming a "harem" compartment.

The ventilator lights in both compartments are a rich ruby. The side windows are divided into two parts, the upper part being fixed, and the lower part being arranged to drop. Both compartments are provided with spring roller blinds of the United Electric Car Company's own type made in English leatheroid. The rich effect of the dark mahogany finish of the first-class compartment is heightened by contrast with the light finish of the second class compartment, and the general appearance of the cars, which are painted on the outside in a dark brown relieved with cream, is very handsome. The platforms are fitted with vestibules and provided with wrought iron gates.



Interior of Salonica Car.

The equipments have been furnished by the Allegemeine Elektricitäts-Gesellschaft, of Berlin.

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# SEE THAT YOU GET YOUR FARES.

By Henry Mozley.

P-A-Y-E having at last arrived from over the water, it seems an appropriate time to revive the question of the collection of tickets by conductors, and to this end I ask you to give the following quotation from an article which appeared in your journal in February, 1895 (18 years ago), page 56.

> "Now as to the check the conductor has against the passenger. It is impossible for any conductor by memory to say who has paid and who has not; therefore, every passenger must prove he has paid on leaving the car or at the collection on nearing a terminus by producing a ticket or pay the fare. It is a great mistake not to collect the tickets which involves no trouble at all. It is not sufficient to issue the ticket; it must be collected, otherwise there is no assurance that the passenger has paid his fare."

It was some time after the above date that certain Canadian managers realised the loss from missed fares, and adopted the P-A-Y-E system to see that all fares were collected.

We owe it to the Aberdeen Corporation that the first tangible proof of the serious losses from missed fares is available. It is impossible to say exactly how much per cent. the loss amounts to, but the result at Aberdeen of adopting the Canadian system to stop the loss cannot fail to arrest the attention of all tramway undertakers.

Figures in the public press show the comparison and gain between the period with and without the P-A-Y-E system, the first week amounting to 13·26 per cent., and later returns showing a gain of 10·00 per cent. Of course, it is not to be believed that the loss from missed fares amounts to anything like this sum, because we all know that tramway traffics all round show substantial increases; moreover, there may be special circumstances which affect the comparisons with last year, but assuming the loss is only 2½ per cent., the following statement will illustrate what an important amount the loss may be. Assuming the loss from missed fares is 2½ per cent. of the annual gross receipts, the amount lost would be as follows:

| Name of Undertaking. | £ | Name of Undertaking. | £ |
|---|---|---|---|
| Accrington .. .. | 685 | Liverpool .. .. | 15,776 |
| Ashton-under-Lyne | 556 | Manchester .. | 22,217 |
| Birkenhead .. .. | 1,531 | Nottingham .. | 4,179 |
| Blackburn .. .. | 1,586 | Oldham .. .. | 2,700 |
| Blackpool .. .. | 1,836 | Preston .. .. | 1,074 |
| Bolton .. .. | 3,378 | Rawtenstall .. | 650 |
| Bradford .. .. | 7,240 | Rochdale .. .. | 1,993 |
| Bury .. .. | 1,690 | Rotherham .. .. | 1,005 |
| Chester .. .. | 306 | Salford .. .. | 6,492 |
| Darwen .. .. | 365 | Sheffield .. .. | 8,964 |
| Doncaster .. .. | 498 | Stockport .. .. | 1,578 |
| Halifax .. .. | 2,625 | Sunderland .. .. | 1,712 |
| Huddersfield .. | 2,695 | Wallasey .. .. | 1,450 |
| Hull .. .. .. | 3,929 | Warrington .. | 572 |
| Lancaster .. .. | 139 | Wigan .. .. | 1,756 |
| Leeds .. .. | 10,188 | York .. .. | 549 |

Supposing the loss only half the amount shown in the above statement, the leakage should receive the serious consideration of tramway undertakers. But how are you to see that no fares are missed? You can either see that each passenger pays on entering the car, or demand from each passenger a ticket on leaving the car *en route*, and go round the car when nearing a terminus and collect the tickets from those remaining on the car to the end of the journey. The only person who can be held responsible for seeing that all passengers pay is the conductor in charge of the car. Therefore, he must be on the rear platform at every stop, where he serves the double purpose of seeing that every passenger pays, and to the safety of passengers entering and leaving the car; a further requirement is an obligation on the driver not to start the car by signals other than those given by the conductor on his bell.

When the loading is heavy, such as at holiday times and week-ends, a second conductor (who need not be fully qualified either from age or experience—a job for learners or youths working up) is necessary, as passengers begin to leave the car before the conductor in charge has got all the fares. It is on such occasions that the need for the collection of tickets to see that all pay is the most necessary and useful—the assistant conductor cannot possibly know whether the passenger leaving the car whilst the conductor in charge is away from the platform has paid his fare or not, unless he demands and collects the ticket or fare. The conductor in charge of the car cannot remember who has paid and who has not; therefore it is necessary he should in every case demand the ticket from the passenger on leaving the car or within a short distance of a terminus, and the greater the loading the greater the necessity for doing this. Very occasionally the loading is so heavy that it may be necessary for a second conductor to join the car within a quarter mile of the terminus to assist him in doing this.

The objection that it takes time for a conductor to attend to the rear platform is not a valid one. The time required for stopping and starting does not exceed an average 16 seconds, and time should be allowed in any case, as it is far more important that the conductor should start the car from the rear platform only than that the time for the journey should be so cut down that a conductor is induced to neglect the rear platform, both for the check on the receipts and for the safety of passengers getting on and off. A good deal more might be said on the question, but for the present it will suffice if I conclude with the independent opinion of four experienced conductors, which will probably be quite as instructive and entertaining as anything I can say.

The views of conductors who are seeing that every passenger pays as an ordinary part of their duties:

Conductor H. McAuley.

1. What advantages to a conductor is the systematic collection of tickets?—It is to see that every passenger on the car is in possession of a ticket and has paid his fare for the journey he has travelled.

2. Suppose there is no collecting; what is the effect on the collection of fares?—Passengers may travel beyond their stages without paying excess fares.

3. Would fares be lost which are prevented by collection?—Yes.

4. Does collection facilitate the work, lessen or increase your work?—It increases the work of the conductor. It keeps the car tidy from being strewn with used tickets. The collection of fares and nipping the discount tickets complicates the duties of a conductor

Conductor W. Heap.

1. One of the chief advantages to a conductor is that he knows if every one has a ticket and where they should get off.

2. If there were no collection it would be possible for a passenger to override his stage, especially with a fully loaded car.

3. To a certain extent it increases the work, but on the other hand it enables you to make sure whether everyone had paid his fare or not, which you could not if there were no collection.

4. With the present number of tickets, workmen's discounts and ordinary, it would be impossible to tell whether everyone has been booked if you did not collect them at all.

Suppose you did not collect the tickets: what is to prevent a passenger from using the ticket twice, if the car was packed as the early workmen's are in a morning, unless an inspector boarded the car, and to do that properly he would have to board every car, which is impossible for one man to do. One of the chief reasons why it is necessary to collect the tickets is by doing so you have a check upon the passengers.

Conductor J. Howarth.

In answer to question No. 1, with regard to the advantages of collecting tickets, I might say that it is a big advantage to the Corporation

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and it also assists the conductor to follow out his duty properly; as you will know we have a lot of intermediate fares overlapping one another and passengers override; now I don't know what they would do if we did not collect tickets. I think some of them would only pay when an inspector boarded the car and then they would probably not book to Burnley or B. St. as the case might be, as they know that the inspector will not ride all the way on that car. We have enough trouble now to get the fares from some of the passengers as they will not pay if the conductor does not ask them for it, and any one can miss a fare as you cannot think of them all. I have had cases where I have been in the car eight or nine times and called out "Fares, please," and you will find some of them haven't booked when you are collecting your tickets.

With regard to no collection of tickets, I think it would be a wrong thing to do, especially in Burnley with such big cars, as it takes one man all his time to watch them now and, if we did not collect tickets, well, I think we should have passengers picking tickets out of the streets and riding with them. If an inspector got on they would put the old ticket away for another time and pay because the inspector had got on, so you see it would need an army of inspectors or checkers to watch them, especially with ordinary discount tickets and workmen's discount tickets. They would get to know the conductor's nipper number and then they could use an old ticket with that conductor's nipper number on. It would be as good as a free pass to some of them, especially men who have worked on the cars, and have left. The same thing would apply again with specials, as some of the conductors out of the depôt run the same special nearly every morning, and the passengers use the cars the same way. You see it would be quite easy for passengers to defraud the Corporation, and an inspector could check the car and not know, unless he thought that someone was doing it. Then he could take the number of the ticket and watch cars in that way.

In answer to No. 3 question, I am certain that more fares would be missed, especially at week-ends and other busy times. Some of the new men don't collect tickets now, as it takes them all their time to collect fares. I have heard of passengers going to Burnley from Duke Bar, and getting off again in the centre without paying their fares, so you see more fares would be lost still if passengers knew that we did not collect tickets.

I have questioned some of the spare men on fares, and they could not tell me a single one of the cross-town workmen's fares; so you see this class of men get all their fares mixed up before they have got halfway through a load. It is a thing of the past with some of them to book passengers while their car is standing at the centre. They would sooner wait until they get a big load, and then they have to book them on the rear platform, and the passengers haven't time to see their tickets punched. I should like to see that notice regarding conductors booking fares when their car is standing at a terminus at busy times repeated, as some of the new men laugh when you tell them to book at the centre. They say the passengers would only laugh at them.

I might say that it involves a little more work to collect tickets, but at the same time it causes the conductors to have to come out to the rear platform to see the passengers get off safely, and I think it is a fine idea for that alone. The ladies want a lot of watching, at least my experience teaches me that, as I have often to help one lady or another. If I didn't they would fall on the road. Then again, the conductor does not get into the habit of ringing off from inside by having to come out to collect tickets; and another thing is, the cars are kept cleaner with our system, and you don't hear of some little boy or girl getting run over through collecting tram tickets out of the street. I have answered the above questions to the best of my ability. Hoping they will meet with your approval.

H. Snape.

Are there any advantages in the system of collecting tickets?—Yes. The conductor is enabled to find those passengers whom he may have missed seeing when they boarded the car. He is also enabled to find out the passenger who may have inadvertently forgotten to offer his fare when the conductor passed round the car. The collection of tickets also enables the conductor to bring to earth the passenger who is deliberately attempting to avoid paying his fare and, although it may be thought by many that, for the sake of a penny, no one would attempt such a thing, I say from experience these passengers are legion. The conductor has every facility for checking the passengers who have overridden their stage.

2 and 3. Would there be a loss of fares by discontinuing the system of collecting tickets?—My eleven years' experience gives me conclusive proof that a great loss would be inevitable. Again, some years ago myself and a friend discussed this question and finally decided to test several towns when on travel. At Manchester, Liverpool, Birkenhead to Port Sunlight, Douglas, I have got off after riding a good distance and paid my fare in the street to the surprise of the conductor.

4. Does the collection of tickets increase the conductor's work?—The collection of tickets slightly increases the work of a conductor, but the effort put forth is a mere detail in comparison to the good results accruing from the system, which I should consider it futile to discontinue.

## ORDERS FOR ELECTRIC RAILWAY EQUIPMENT.

The following important orders for electric railway equipment were placed some weeks ago, as previously reported in our Saturday issues.

Train Equipments for the London and North Western Electric Lines.

A contract has been arranged with the Maschinenfabrik Oerlikon, near Zurich, to supply electrical equipments for over 40 trains required for the electric section of the London and North Western Railway. A previous order for four train equipments had been placed with Siemens Brothers Dynamo Works, Limited. Particulars as to the electrification scheme were given in The Tramway and Railway World of January 9, 1913.

London and South Western Railway.

The contract for motors and other train equipments required for the first part of its electrification scheme, as described in these columns on December 12, 1912, has been let to the British Westinghouse Electric and Manufacturing Company, Limited, Manchester. The conductor rails will be supplied by Messrs. Bolckow, Vaughan, and Company, Limited, Middlesbrough, and the North Eastern Steel Company. Orders for high-tension cables have been placed with Messrs. Siemens Brothers and Company, Limited. Electric energy will be generated at a pressure of 11,000 volts at a station to be erected by the railway company. Units of 10,000 kw. and 5,000 kw. will be installed. The sub-station equipments will be obtained from the British Thomson-Houston Company, Limited. The first section to be electrified will be the line from Waterloo *via* Clapham Junction to Richmond, Twickenham, Kingston, and back to Waterloo *via* Wimbledon The electrical work is being carried out by the Company's electrical engineer, Mr. Herbert Jones, the whole of the work being under the supervision of Messrs. Kennedy and Jenkin. Permanent way work will be carried out by the company's staff under the supervision of the chief engineer, Mr. J. W. Jacomb-Hood.

## PROTECTIVE DEVICES AT THE LONDON COUNTY COUNCIL TRAMWAY STATION.

At the meeting of the London County Council just before the summer recess, a specially important report was presented by the Highways Committee upon the subject of guarding against breakdowns at Greenwich power-station. The committee stated that they had given special consideration since the serious breakdown of plant at the station in April last to the question of arranging for the installation of protective devices with the object of guarding against breakdowns in future. Mr. A. L. C. Fell, chief officer of tramways, had conferred with Mr. G. W. Partridge, chief engineer of the London Electric Supply Corporation, and as a result the chief officer had submitted certain proposals. The cost of giving effect to the scheme was estimated at £25,000, including £7,000 for the switch gear required for the two 8,000-kw. turbo-generators, which the Council on May 6 last decided to obtain from the British Westinghouse Company. The committee were strongly of opinion that these protective devices should be installed, and they recommended accordingly. They also proposed that Mr. Partridge should be paid 200 guineas.

The Finance Committee, reporting on the matter, said that the principal question which arose from the financial point of view was the bearing of this expense, regarded as an insurance against further breakdowns. A breakdown such as that which occurred recently was a very serious matter as regarded loss of revenue, and it was also very important to establish and maintain the prestige of the tramway undertaking for reliability. If this could be secured by the expenditure proposed, the money might perhaps be regarded as well spent. While this was so, this new charge on the undertaking at the present time in order to preserve existing revenue was a serious mattter. The report was approved.

## TROLLEY WIRE DESIGN ACTION.

Vice-Chancellor Smith, K.C., on July 8 gave his decision in the case in which the British Insulated and Helsby Cables, Limited, of Prescot, near Liverpool, sued the London Electric Wire Company and Smiths, Limited, of the Anaconda Works, Salford, for an alleged infringement of registered designs for wires for overhead trolley tramways, and asked for an injunction to restrain defendants from further use of their copyright. His Honour remarked that one of the designs was registered on March 7, 1908, and had been called in the case design A. The other was registered on April 9, 1908, and had been known as design B. Both wires were grooved, and were about half an inch broad between the lower shoulders at their broadest part, being rather less from the top of the semi-circle to the lowest part of the segment. Judging by the eye alone, to which test he was driven, he was unable to see such a distinction between plaintiffs' designs and the others as would enable him to say that plaintiffs' designs were novel. If design B was valid he held that there had been no infringement, and there would be judgment for defendants with costs.



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THE
# Tramway and Railway World

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LONDON, AUGUST 14, 1913.

**Rating of Tramways.**

At length the final decision has been given on the question of the rating of tramway tracks. The House of Lords on July 24, in the case of the Tottenham Urban District Council against the Metropolitan Electric Tramways, decided that tramways must continue, as in the past, to pay rates on the full net annual value and not on one-fourth of that value as contended by the tramway authorities. Under the Public Health Act, 1875, railways pay on one-fourth of their net annual value, and the decision of the House of Lords in the Wakefield case in 1908 put light railways in the same favoured position. In the present case the Divisional Court decided against the company; this was reversed by the Court of Appeal, and now the House of Lords have restored the judgment of the Divisional Court. In the briefest form it may be said that the Court of Appeal held that the subject rated is in the words of the Public Health Act "land used as a railway." The House of Lords on the other hand (as will be seen from the full text of the judgment published in this issue) deny that a tramway is a railway in either the legal or the popular sense, and they hold that if the abatement provided for railways in the Public Health Act had been intended to apply to tramways the Act would have said so. Lord Moulton's remarks about the construction of tramways under powers obtained by a Light Railway Order being an abuse of the Light Railways Act are quite erroneous. At the time the Act was passed it was frequently stated both in Parliament and out of it that the Act could be used for authorising lines on streets and roads. That, however, is beside the mark. The law as now declared gives the absurd result in Tottenham that one part of a through route is rated four times as heavily as another part because the former was authorised as a tramway and the latter as a light railway. Yet the one part is indistinguishable from the other as to mode of construction, equipment, and appearance. The same cars run over both parts. That is the local position. The general one is that no tramway in England gets relief in rating. Tramway authorities all over the country must regret the decision, but their business now is to persuade the Government if possible to pass legislation for the reduction of the excessive burdens on tramways, and at the same time to put a fair burden on the railless trolley and motor omnibus.

**Necessity for Relief of Tramway Taxation.**

Events arising out of motor omnibus competition in the metropolitan area continue to develop, and they point more and more decisively to a certain final result. That result—recognised on all hands by reasonable people—will be the allocation to omnibuses of a fair amount of taxation, the proceeds of which will go direct to road maintenance. One new event at the end of last month was the development of the promised action by London County Council in the matter of the rating of tramway tracks. It was announced at a meeting of the Council on July 29, that in consequence of the decreased revenue of the tramways owing to omnibus competition, objections to the assessment of the tracks have been served in no fewer than 23 metropolitan boroughs. The boroughs make the assessment, and it is they who receive from the County Council the rates on the tracks. If this action is successful, the result—while putting the tramway accounts into a more favourable state—will be somewhat serious for

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the ratepayers. Any considerable reduction in the assessment of the tramways must result in an increase in the rates per pound. It seems that in one case which is expected soon to be settled, the reduction in tramway assessment will probably involve an increase in the rates of about one-third of a penny per pound. Then, on July 30, just before the rising of the Courts for the long vacation, an application was made in the King's Bench Division of the High Court for a rule *nisi* for a mandamus calling on the Assessment Committee of Islington Borough Council to show cause why they should not appoint a person to make a provisional valuation list, with a view to inserting in it the part of the London County Council Tramways in the borough at a reduced assessment. It was mentioned that the receipts from the tramways in the borough have, during the past two years, in consequence of omnibus competition, dropped from £114,000 to £89,000. It appeared that other Borough Councils have agreed to make new provisional lists, and the Court granted the application.

* * * *

Another factor which is becoming more and more prominent is the increased cost of street maintenance owing to motor traffic, not merely to the County Council for the tramway area of the streets, but to all the Borough Councils for all other street surface. One member of the County Council stated at the meeting referred to that it was estimated that within the next few years a sum of three or four millions sterling will have to be spent on remaking with thicker and stronger foundations the streets and roads of the metropolis in order to withstand heavy motor traffic. In this direction also there is the prospect of higher rates. Thus, not only are all metropolitan tramway undertakings suffering, but the whole community has to pay for the maintenance of a permanent way for omnibuses which are earning large dividends for shareholders. The omnibuses have nothing to pay for the construction of their permanent way, nothing to pay for its maintenance, and nothing to pay as rates on it. The tramways have to pay all three. It is quite plain that the position is becoming intolerable. We have in the past foretold what would happen, and have urged action with the object of influencing Parliament. West Ham Corporation Tramways, in consequence of the competition, show a loss on last year's working—the first loss they have ever made. Unless something is done, other metropolitan tramways will follow suit. It is imperative that all concerned should follow up the call recently given by Mr. Goodyer, the manager of Croydon Corporation Tramways, and set a full-fledged agitation on foot. It is perfectly clear that if omnibuses had to bear the burdens of taxation and road maintenance which lie on tramways, it would be impossible for the omnibuses to be run at a profit. We do not desire that taxation should be so heavy as to be an obstruction to the extension of motor omnibus services; but these should bear a fair share of the public burdens. It is fair to no one that the omnibus undertakings should be allowed to remain parasites on the community for the purpose of paying dividends to shareholders. While all these things apply to London to-day, they may speedily apply to other parts of the country, both urban and rural, unless the local authorities are very alert. Even now the counties are threatened with interurban services of omnibuses which within six months would smash up rural roads which are not constructed to withstand such traffic.

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**Industrial Efficiency.**

The managers and directors of tramway undertakings, in common with those responsible for the conduct of every sort of industrial and commercial enterprise, are now constantly being confronted with demands for increased wages pressed upon them by labour organisations in a manner they are not always able to resist. In meeting such demands the former are often under the disadvantage of not being able, like the latter, to make a corresponding advance in price of the goods produced, *i.e.*, in the service rendered to the public. To require that the particular workers concerned shall earn the additional remuneration demanded by extra exertion on their part is generally impractical, if only because such demands are usually accompanied by an agitation for easier conditions of employment. In these circumstances any suggestion of a remedy or partial remedy deserves attention. The tramway manager will naturally welcome any suggestion which provides

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him with another resource in defending the profits of the undertaking from the effect of the demands made upon it. Such a resource, or a suggestion towards it, comes from the least expected quarter. Psychology is a word familiar to all, but one usually associated with the more abstract and least practical of philosophical discussions. In its latest developments, however, this science has taken a severely utilitarian turn. Modern psychology deals with the processes by which the mind comes to its decisions and imposes them upon the body. With no practical aim in view, and actuated by pure love of science, psychologists for many years devoted themselves to the elaboration of methods by which these processes could be analysed, arranged, and exactly measured both in regard to the time required to perform them and the efficiency with which they are done. A mass of information was thus accumulated which some business-like people in the United States of America were the first to see might be put to profitable purposes. In the first place it was found, as the result of analysis, that the processes instinctively adopted by workers in many manual occupations were unnecessarily complex, that willing workmen could easily be taught to effect the same operations in simpler ways; in some cases, of which the handling of bricks and mortar in certain building operations is an example, the individual's output was so much improved that the workmen could be re-trained at the employer's expense, and their wages largely increased with economy. In the next place it was found that individuals varied to an enormous degree in unsuspected ways. That a thing done slowly and clumsily, though conscientiously, could be accomplished quickly, accurately, and easily by another. In some cases, an example of which was furnished in the operations by which ball bearings are manufactured, an increased output of nearly 100 per cent. was brought about by setting each employee to the detail of work to which, as the result of a psychological examination, he was found to be adapted.

* * * *

If a tramway manager is able to choose his employees and put them to work with such discrimination that none is occupied but with what comes easiest to him, the least advantage which may be expected is a more contented body of men, and that the working should be neater, quicker, and in other respects better, is no more than a reasonable anticipation. In such achievements as have been described, methods of psychology are applied to the attainment of objects which have been the conscious aim of all since industry of any kind began. The only difference is that what was formerly pursued by vague and unco-ordinated means of observation and conjecture, is now sought out by scientific methods with instruments of precision. In its latest developments psychology makes a new departure altogether, and seeks to enable us to form judgments upon an individual's capabilities which have hitherto rested upon guess-work only. Who can say how a man will behave in an emergency? In the case of a tramcar driver the emergency may be that caused by a child, or some other creature getting in front of the car while it is in motion. The driver has then to take in a lot of facts relating to distances, positions, and relative speeds, to come to a decision and to act upon it, within perhaps some fraction of a second. Here, again, individuals differ enormously in innate capacity, and ordinary life seems to afford no indications, or misleading indications only, as to the nature and degree of such differences. The conclusive test which the street affords is too dangerous and too expensive. It was the high figure to which "compensation of accidents" rose in some American tramways that first led to the application of psychological methods for ascertaining the true qualifications of tramcar drivers for the exigences of their employment. Professor Munsterberg, who is one of the pioneers in the application of psychological methods to improvements in industrial operations, attacked the problem first by analysing the mental and nervous processes called into play, and then by inventing an instrument by which these processes could be measured and recorded. The men were subjected to examination by the help of this instrument, and those who failed to exhibit average proficiency were gradually eliminated from the service or set to other work better adapted to their capabilities. It is satisfactory to relate that in every case in which the method was adopted a marked reduction in the number and seriousness of accidents ensued, so the matter well deserves attention.

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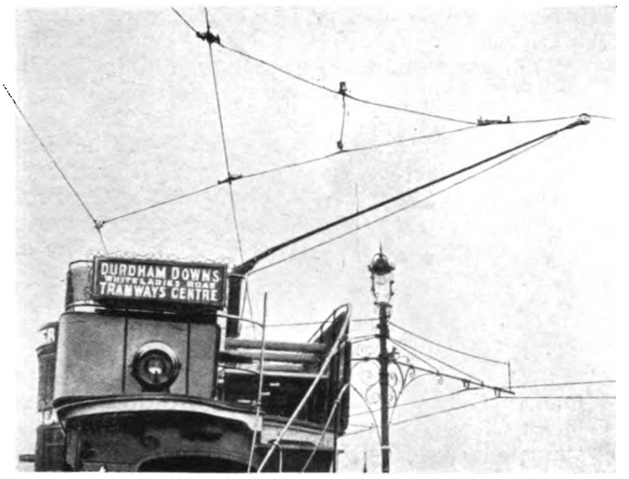
## AUTOMATIC TROLLEY REVERSERS.

The convenience of automatic trolley reversers is so unquestionable that it is surprising that they are not in more general use. In the accompanying illustration a car is shown passing under a reverser which has been in use for the past 10 years in Bristol, and is one of 20 erected in various parts of the city. All of these are giving complete satisfaction.

At dark termini this apparatus has the great advantage that by the use of it the lights in the cars are kept burning, thus obviating the danger and confusion that,




Trolley Boom on Automatic Trolley Reverser.

owing to everything being plunged in darkness, often arises when the trolley is being turned round by the conductor. In places of this kind it is, of course, often the practice to put up lights, but the expense of this is considerable and the upkeep troublesome, and of course such lights are unnecessary where the reverser is used. There are other advantages in the use of this reverser. In the first place a considerable saving of time is effected if the car happens to be late, or at busy times when it is important for the cars to clear as quickly as possible, and, secondly, the damage done to the trolley wire and trolley head in the process of getting the trolley on to the wire is entirely done away with.

The automatic reversibility of the swivelling trolley head affords its greatest advantage over the straight-running head, and the fact that the reverser is so little used at present can only be due to the simplicity and cheapness of the apparatus not having been properly appreciated in the right quarters. With reversers at each of the termini the trolley rope can be tied to the boom on leaving the car shed and not touched until the car runs in at night.

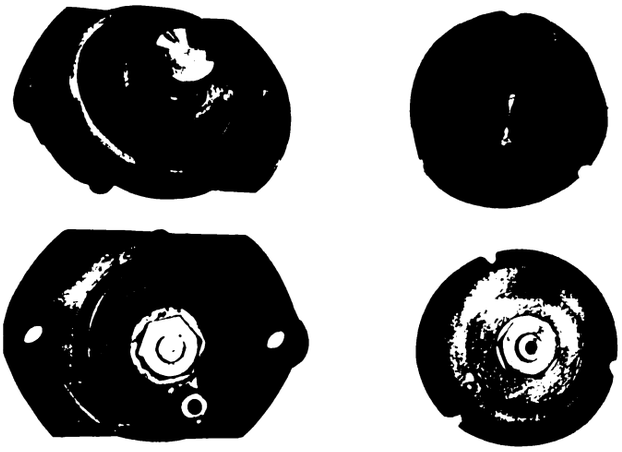
In order that the trolley shall have perfect freedom for the automatic reverser it is essential that a swivelling contact of approved type shall be fitted to the trolley base. After considerable experience in the matter Messrs. Brecknell, Munro, and Rogers, of Bristol, designed and patented a swivelling contact which may be used in connection with either single or double-deck trolley bases, and not only gives the freedom required for automatic turning, but at the same time protects the trolley standards from becoming electrically charged. The trouble occasioned by a leaky conductor must obviously be introduced by a fault in the cable, such faults developing during the daily use of the trolley and by way of a breakdown from wear in the insulation covering the conductor.

In almost every case this fault is due to the straining or twisting of the cable during the partial revolution of the trolley.

Until comparatively recent years the trolley cable was led straight through the trolley and coiled beneath the trolley base in order to permit of its partial revolution without unduly straining the insulating covering of the cable; such an arrangement at the best is but a compromise. The alternative of the plan above referred to is the provision of two contacts jointed and so arranged that the cables may be connected on the upper and lower side of these contacts in such a manner that the trolley may revolve without any relative movement with the cable. All earlier forms in which this device was put upon the market contained weaknesses which ultimately led to the temporary discontinuance of its use, the attendant troubles being worse than the difficulties they were designed to obviate. These troubles were chiefly due to imperfect insulation and bad contact.

The principal features of the "Brecknell" swivelling contact are the method of preserving efficient contact, the arrangement of the insulation and provision for draining and ventilating the whole so as to maintain the insulation surfaces in good condition, and the means by which the former troubles which existed with regard to lubrication are overcome. The two contacts have convex and concave surfaces, which are struck at the correct radius so as to compensate for any change in alignment due to the ordinary wear of the trolley.

The surfaces of the insulation have been ascertained to be the minimum advisable, and by a system of draining and ventilation holes, the moisture that ordinarily collects on all internal metallic chambers during the various changes of temperature and atmospheric conditions is carried away, and the insulation surfaces maintained in a dry and efficient condition. The area of contact and the spring controlling the pressure are so adjusted that, with the two special alloys used in the construction of the pair of contacts, no lubrication is necessary. In fact, one tramway



Brecknell Swivelling Contact.

company who are using a large number of these have not found it necessary to give these contacts any attention during a period of three years, over which time no fault of any description had developed. The period named was not closed by any trouble, but was merely the time at which inquiry was made as to their efficiency.

**Municipal Tramways Association.**—At the meeting of the London County Council on July 29, Mr. W. J. Squires, vice-chairman of the Highways Committee, and Mr. A. L. C. Fell, chief officer of tramways, were appointed to represent the Council at the conference of the Municipal Tramways Association, which will be held at Sheffield on September 24, 25, and 26.

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## CONVERTIBLE CARS AT BALLARAT.

The Electric Supply Company of Victoria, Limited, who operate the tramways and light and power supply of the cities and districts of Ballarat and Bendigo, Victoria, have lately put into service five new cars. These cars at Ballarat, owing to the rather exceptional climate, have been specially designed to suit both winter and summer conditions. The summers are fairly hot, but owing to the elevation of the city, 1,500 ft., the

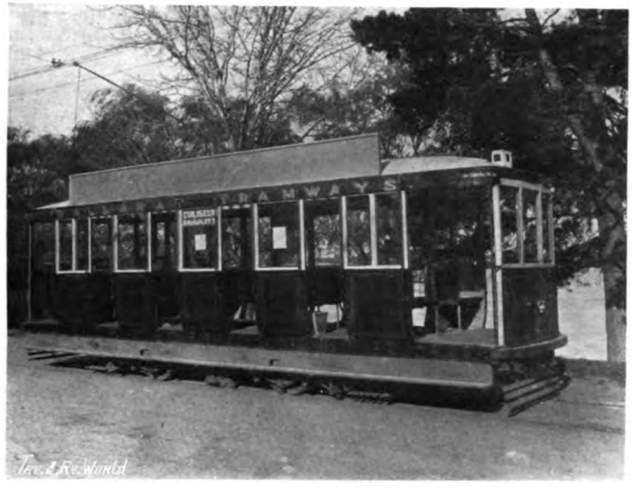

Fig. 1.—Arrangement for Summer Service.

winters are occasionally very cold, the climate being similar to that at home, but not so severe.

The photographs reproduced herewith show the Ballarat car, of which three have been put into service. The first view (Fig. 1) shows the car arranged for summer service, and the second photograph (Fig. 2) for winter service. The two windows in each of the bulk heads, and the three windows in the glass screens, all let down, so there is a current of fresh air right through the car. This gives a form of construction

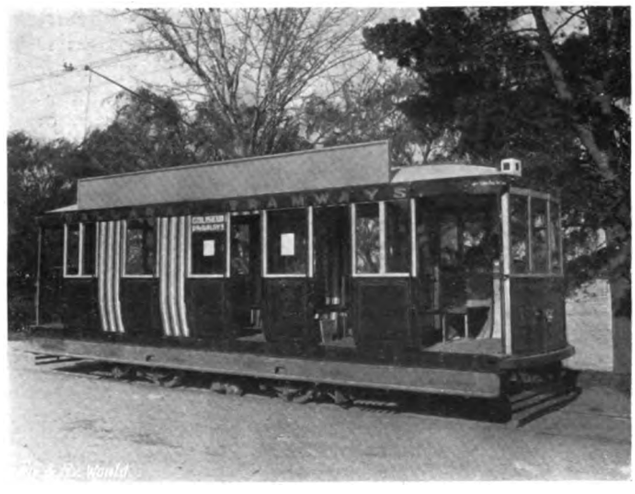

Fig. 2.—Arrangement for Winter Service.

which is not usual in Australia, but which is very necessary for climatic reasons. The cross seats are arranged back to back and the centre seat in each one is removable. Opposite each of the four side openings, excluding the end platforms, spring roller blinds working in side guides can be pulled down. In rainy weather in summer time it is quite sufficient to pull down these blinds on the weather side. The doors in each of the bulk heads can be bodily removed for summer service.

In Fig. 2 each of the central cross seats is shown removed; the doors in the bulk heads and the spring roller blinds are drawn down opposite each of the four side entrances. Two of the front blinds are shown up, so as to show the back blinds, and the central seats removed. The windows in the bulk heads and screens are all drawn up, and passengers then enter the car from the end platforms through the door in the bulk head. The car as arranged thus is quite comfortable, and owing to the large side windows is quite bright inside.

The car has a seating capacity of 50, when arranged as a summer car, and 45 as a winter car. The end platforms are of a large capacity and are useful for accommodating standing passengers in rush traffic. The overall length of the car from buffer to buffer is 31 ft.

The car bodies were built by Messrs. Duncan and Fraser, of Adelaide, and are carried on the Brush Engineering Company's patent long wheel base trucks. The electrical equipments were provided by the British Thomson-Houston Company, and are of the American General Electric Company's manufacture. The cars are also fitted with Westinghouse track brakes.

## LIVERPOOL'S DECORATED CAR.

One of the attractions of the visit of the King and Queen to Liverpool on July 11 was the decorated and illuminated car designed by the general manager of the Corporation Tramways. The car was decorated with garlands of leaves and flowers, red and pink roses forming a good contrast to the green foliage. On the sides of the car were representations of the Colonies, whilst on the windows were transfers agreeing with the Colonial representations. The ends of the car were designed to form bowers, and above these were canopies draped with purple and gold containing life-like busts of their Majesties—that of the King being on one end of the car and that of the Queen on the other. Above the canopies were mounted large gilded crowns.

At night the car was illuminated with some 1,500 lamps in ruby, blue, and white, these being entwined in the foliage, set off the floral decorations. A large star, formed of various coloured lamps, was mounted in front and another at the rear, the colours changing automatically, being controlled by a rotary cut-out driven by a belt off the axle. The car body was picked out in gold and white, whilst between each lamp were placed copper reflectors, which enhanced the lustre at night time. Our photographs give some idea of the elaborate decoration of the car, which ran on almost every route, and during the royal progress appeared at intervals on the line of route as their Majesties passed by.

The week of the Royal visit imposed an enormous tax upon the tramway department; and it is highly gratifying to know that not only was the working of the tramway service carried out with the utmost efficiency under the direction of the general manager (Mr. C. W. Mallins) and his staff, who were working early and late for the greater part of a week, but that a record has been established in the matter of traffic receipts.

A glance at the figures given below, which were presented in a statement to the Tramway Committee, gives an idea of the enormous volume of traffic dealt with on five days when the public took advantage of the cars to view the decorations and to witness other features of the Royal visit. The total revenue for five days was £13,974 9s. 6d., there were 2,856,896 passengers carried, and the mileage covered was 219,627.

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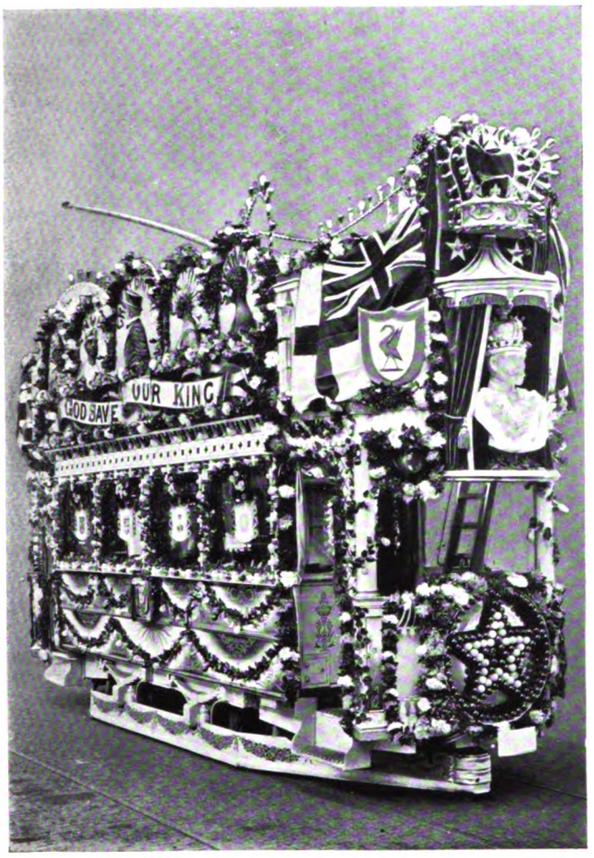


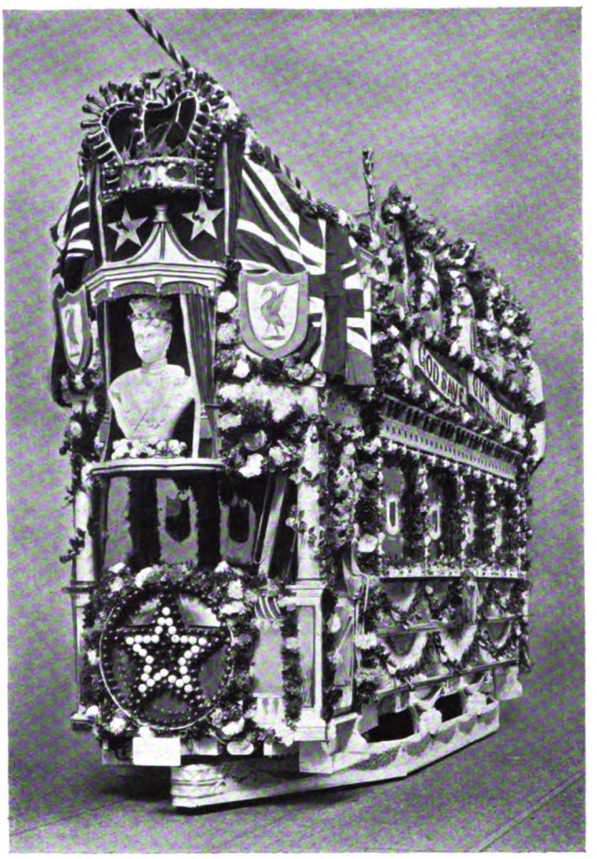

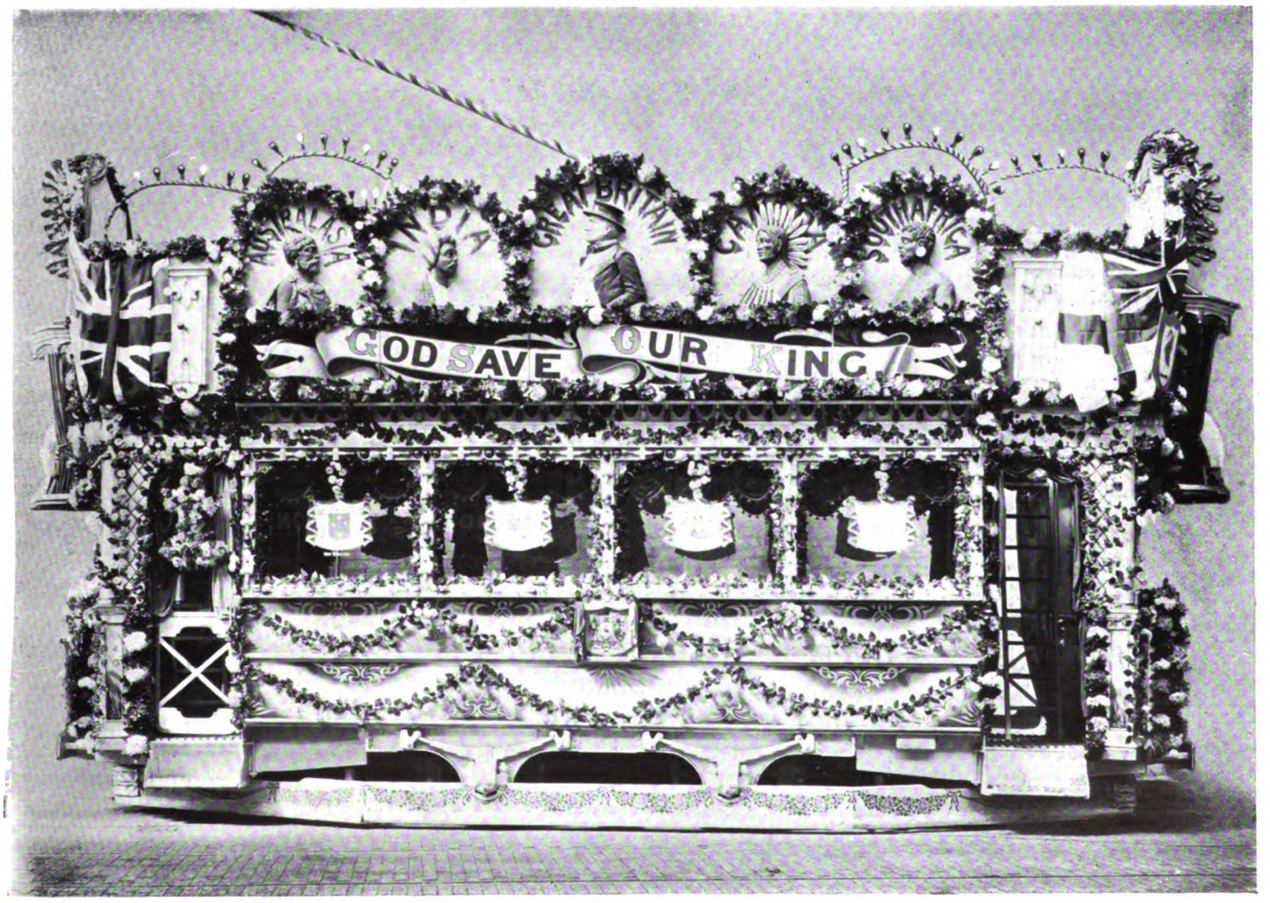


Decorated and Illuminated Car—Liverpool Corporation Tramways.

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The high-water mark of traffic was reached on Friday, the occasion of the State visit of their Majesties, when no fewer than 750,641 persons travelled by the cars—practically equal to the entire population of Liverpool. The receipts for the week ending Saturday, July 12, show an increase of £4,173, but in addition there is the very substantial yield from the following Sunday's traffic of £2,145 17s. 4½d.

The results attained exceed all previous records for tramway traffic in Liverpool. The nearest to it was the immense volume of traffic on the occasion of the Coronation of King Edward in June, 1902. The principal day, Thursday, June 26, 1902, produced an income of £3,083 5s. 0½d., which is easily beaten by the takings on Friday, July 11. A further testimony to the smooth and efficient working of Liverpool tramway system during a period of abnormal pressure is that no accident of a serious character occurred during the Royal week.

The returns were as follow:

| | Receipts. | Passengers. | Mileage. |
|---|---|---|---|
| | £ s. d. | | |
| Wednesday, July 9 .. .. | 2,013 15 5½ | 431,248 | 39,120 |
| Thursday, „ 10 .. .. | 2,942 1 9½ | 608,304 | 43,213 |
| Friday, „ 11 .. .. | 3,802 3 0½ | 750,641 | 52,408 |
| Saturday, „ 12 .. .. | 3,070 11 10 | 639,778 | 48,004 |
| Sunday, „ 13 .. .. | 2,145 17 4½ | 426,835 | 36,792 |
| Total for five days (including Sunday).. | 13,974 9 6 | 2,856,896 | 219,627 |

The traffic receipts for the week ended Saturday, July 12, were as follow, viz.:

| | Receipts. | Passengers. | Mileage. |
|---|---|---|---|
| | £ s d. | | |
| | 17,097 1 9 | 3,545,582 | 283,357 |
| Increase over the corresponding week of 1912 | 4,173 0 9 | 795,688 | 42,586 |

THE TRAMWAY COMMITTEE'S APPRECIATION.

At the committee meeting Major R. J. Clarke, deputy-chairman, presiding in the unavoidable absence of the chairman (Alderman F. Smith), expressed on behalf of the committee their satisfaction at the splendid results achieved, which proved that no effort had been spared by the general manager, the tramway staff, and the electrical staff in making the best arrangements for the travelling public. On the suggestion of the chairman, the committee passed a resolution expressing their sense of appreciation at the excellent work which had been performed by those concerned.

It was also decided that each man at Lambeth Road works—mechanics and others employed in the sheds—who had a holiday on the Friday of the Royal visit should be voted a day's pay. As regards the whole of the staff who had to work on that day, and had no holiday, they were voted double pay.

## TABLE MOUNTAIN (CAPE TOWN) RAILWAY PROJECT.

In September last Mr. H. H. Peters, a mountain railway expert, of Zurich, visited South Africa, at the invitation of the Cape Town Council, for the purpose of advising as to the best means of constructing a railway to the summit of Table Mountain. Careful surveys were made, with the view to the selection of the most feasible routes, and plans have been completed for two alternative schemes. One of these provides for a funicular railway, starting from Rocklands, and the other for a rack and pinion line, starting from Kloof Nek. The former would be an open-air line for almost the whole distance, but the rack and pinion line would include several tunnels. A tramway would have to be constructed to Rocklands, the starting point of the funicular line. The terminus would be at the top of the gorge, and a short distance before reaching the summit the line would pass through a tunnel about 270 ft. in length. The rack and pinion railway would start from Kloof Nek, and a little less than a mile from the starting point would go through a tunnel about 450 ft. long. There would be a second tunnel nearly 100 ft. in length, and a third of 175 ft. The time required for the journey to the summit by the funicular railway would be 26 minutes, and by the rack railway 52 minutes.

The British Trade Commissioner now reports that the Cape Town Corporation has unanimously approved of the funicular railway scheme as opposed to the rack railway, the latter being considerably more expensive and offering no greater advantages. The Cape Town Corporation has submitted the scheme for the approval of the other local municipalities. The Trade Commissioner considers that the scheme will in all probability be adopted.

## BOOK NOTICES.

MANUAL OF ELECTRICAL UNDERTAKINGS.

This indispensable manual, now in its fourteenth year, should be, and we hope is, known to everyone concerned in the electrical industry. It is compiled under the direction of Mr. Emile Garcke, M.I.C.E., and contains, as usual, full statistics, brought up to date, of electric lighting, power, and traction works in operation or projected in Great Britain and Ireland, India, and all British Colonies. The present volume contains 1,856 plus cxciv. pages (8¾ in. by 5¾ in. by 2¾ in.), and is published at 21s. net by the Electrical Press, Limited, 13-16, Fisher Street, near Kingsway, London, W.C. Of "Garcke's Manual" it is sufficient encomium to say that it fully maintains the reputation it has gained in all these years as an indispensable and reliable book of reference. The new feature of the previous edition, viz., the large map showing electric light, power, and traction undertakings in the United Kingdom, is again issued as a separate supplement, being too large to be inserted in the manual itself.

"SANE TRADE UNIONISM" AND OTHER VOLUMES.

The National Library (Collins Clear Type Press, London and Glasgow) consists at present of twenty small octavo volumes, the outstanding feature of which is specialised information by the most competent authorities. Each number is printed in clear type, runs to about 270 pages including an index, and the price of each in full cloth is 1s. net. No. 1 has been specially written for the series by Mr. W. V. Osborne on "Sane Trade Unionism." Mr. Osborne, who was formerly an employee of the Great Eastern Railway Company, is the central figure in the controversy raging round the "Osborne" judgment, and has the right to speak with authority on the subject he has chosen. The author is evidently an original thinker, and the bibliography at the end shows that he has industriously studied his subject. He warns trade unions of the dangers ahead due to the competition of Asiatic labour—which is gradually working into the same grooves as the older associations of workmen in Europe and America. Their inferior standard of living will, in course of time, constitute a serious menace to the progress of other nations. Union leaders should strive above all to bring capital and labour together. "In this direction lies the mission of sane unionism."

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# THE RATING OF TRAMWAYS.

## JUDGMENT BY THE HOUSE OF LORDS.

The House of Lords, on July 24, gave the important decision that tramways in England are liable to pay rates on the whole of their annual value and not on one-fourth as is the case with railways. This decision was arrived at in the well-known case of the Urban District Council of Tottenham *v.* the Metropolitan Electric Tramways, Limited, and it involved reversing the finding of the Court of Appeal and restoring that of the Divisional Court. The text of the decision is appended:

TOTTENHAM URBAN DISTRICT COUNCIL, *Appellants*,

AND

METROPOLITAN ELECTRIC TRAMWAYS, LIMITED, *Respondents*.

The LORD CHANCELLOR: My Lords, in this case I have had the advantage of considering the judgment about to be proposed by my noble and learned friend, Lord Moulton, and I concur in it. I am asked by my noble and learned friend, Lord Shaw, to say that he also concurs in that judgment.

LORD MOULTON: My Lords, this is an appeal from a judgment of the Court of Appeal in England upon a special case stated by two of His Majesty's Justices of the Peace in and for the County of Middlesex under the provisions of the Summary Jurisdiction Acts, 1857 and 1879, for the purpose of obtaining the opinion of the High Court on a question of law which arose before them upon an application of the appellants, the Tottenham District Council, to enforce the payment of the balance of a certain rate amounting to £499 12s. 6d. by the respondents, the Metropolitan Tramways Company, in respect of a tramway owned and worked by the respondents in the district. The respondents had paid a sum equal to one-fourth of the said rate, and claimed to be exempt from payment of the other three-fourths by reason of the provisions of section 211 of the Public Health Act, 1875. The magistrates held that the respondents were not entitled to the benefit of the exemption, and affirmed the rate, but at the request of the respondents stated the present special case in order to obtain the decision of the courts upon the point.

The special case came before a Divisional Court of the King's Bench Division which affirmed the decision of the Magistrates, it being admitted by the respondents that the case was covered by the decision of a Divisional Court in the case of *the Swansea Improvements and Tramway Company v. The Swansea Urban Sanitary Authority*, and that such decision was binding on the Divisional Court. From this decision an appeal was brought to the Court of Appeal, which reversed the decision of the Divisional Court, and in doing so expressly overruled the Swansea case. From this decision of the Court of Appeal the present appeal is brought.

The tramways in respect of which the rate is claimed were constructed by the North Metropolitan Tramways Company under the North London Suburban Tramways Order, 1879 (confirmed by the Tramways Order Confirmation Act, 1879), the North Metropolitan Tramways Act, 1892, and the North Metropolitan Tramways Act, 1897. To these Acts the provisions of the Tramways Acts, 1870, apply. It has not been suggested (nor could it have been so with any show of reason) that any portion of these tramways stands in a different position to the others with regard to its right to the exemption claimed. It will, therefore, conduce to clearness if the question of the exemption be considered in respect of some one of the tramways, say that constructed under the Order of 1879. The right to the exemption in question, if it exists, must have accrued at the date of its construction, because there has been no subsequent legislation which could in any way affect it.

Section 211 of the Public Health Act, 1875, deals with the assessment and levying of general district rates under the Act, and provides that they shall be levied on the full net annual value of such property. But there are certain exceptions, the only relevant one being as follows: "Section 211 (1) *b*: The owner of any tithes or of any tithe commutation, rent charge, or the occupier of any land used as arable, meadow, or pasture ground only, or as woodlands, market gardens, or nursery grounds, and the occupier of any land covered with water or used only as a canal or towing path for the same, or as a railway constructed under the powers of any Act of Parliament for public conveyance, shall be assessed in respect of the same in the proportion of one-fourth part only of such net annual value thereof."

Speaking for myself, I cannot think that if the question of the exemption or non-exemption of a tramway from the full incidence of the general district rate had come before the courts soon after the date of this Act, the courts would have found any difficulty in deciding the question, or would have had any doubt that tramways were not included in the term "railways." For to my mind these two terms had, in the public legislation of this country, different and distinct meanings attached to them by the highest sanction that it is possible to give, *i.e.*, that there existed two independent groups of statutes of a public nature, the one applying to railways and the other to tramways, framed on distinct lines and recognised as applicable to distinct subject matter, and neither finding it necessary to give any definition of such subject matter. Nothing could be more striking than the careful and elaborate research of the counsel that appeared on behalf of the respondents before this House in the argument of this appeal, and yet they have been unable to find one single instance of confusion in the use of these terms in public legislation or of doubt as to the limits of the applicability of any piece of public legislation in this respect, at all events before the passing of the Light Railways Act, 1896. Indeed, if the public Acts relating to railways be examined, it will be found that in the one or two instances where the legislation is intended to apply to tramways also, it is effected by the insertion ~~of a~~ special interpretation clause providing that in that Act the term railway shall include tramway. But in the great bulk of the public legislation relating to railways there is no such definition clause, and that legislation has universally been understood and interpreted by the courts as applying only to that which is popularly known as a railway, and not to that which is popularly known as a tramway.

To my mind, therefore, the fact that the legislature uses the word "railways," and does not say "railways and tramways," in section 211 of the Act of 1875, is conclusive as to whether it is intended that tramways should enjoy this exemption. For in the year 1875 tramways loomed very large in public view. The demand for them, and the necessity of regulation of the terms on which the privilege of constructing them should be granted to private undertakers in view of the interest of the public, had during the preceding few years become so marked that a most important general Act regulating them, *i.e.*, the Tramways Act, 1870, had been passed after much discussion and careful examination in its passage through Parliament. It is, to my mind, impossible that the legislature should in 1875 have used the word railways as including tramways without inserting a definition clause expressly including them, as it had done in certain previous Acts. But if it had intended that the exemption should apply to tramways, it would, in my opinion, have in all probability taken the simpler course of saying so expressly in the clause itself, and I am confirmed in this opinion by the language of section 147 of the same Act, which deals with the power of an urban authority to adopt bridges within their district. Here the words are: "Any urban authority may agree with the proprietors of any canal, railway or tramway to adopt or maintain any existing or projected bridge, viaduct, or arch within their district over or under any such canal, railway or tramway."

In the exemption that is to be found in section 211 (1) (*b*), canals and railways are mentioned, but there is no mention of tramways, and it would in my opinion, be contrary to sound principles of the construction of statutes if we were to interpret railways as including tramways in this section, in disregard of the consistent usage of the words in public statutes, and the evidence which the statute itself gives in section 147 that it recognised the distinction between the two terms.

The respondents attempt to meet these difficulties by a very ingenious argument. They point out that the Public Health Act, 1875, was a consolidating statute, and that clause 211 is taken from the Public Health Statute of 1848, and they argue, therefore, that it should be interpreted as the language would have been interpreted in 1848 and not in 1875. There are two answers to this argument. In the first place, the Public Health Act, 1875, was not purely a consolidating statute. It purported to amend as well as to consolidate the existing Public Health Statutes, and did so to a very substantial extent. But the main answer to the argument is that no assistance is obtained by going back to the Act of 1848. At that time public tramways, in the sense in which the words are always used, were unknown, and certainly the term "railways" could not have been used by th legislature with the conscious intention of including therein what w now know as tramways. If this House had to determine the question as if it arose in the year 1848, one would have to look closely at the language used in order to learn from it what were the grounds on which railways were granted the exemption in order to decide whether those grounds applied to the new type of works known as "tramways." It is always a dangerous, and generally an unfruitful, task to seek for the motives which influence the legislature in any particular legislative Act, but if I were to permit myself so to do I should base my conclusions on the company in which I find railways standing in the exemption. Its companions are "land covered with water," "land used only as a canal or a towing path for the same," and it itself appears as "land used only as a railway constructed under the powers of any Act of Parliament for public conveyance." In view of the common characteristics of these three it appears to me to be that the legislature is dealing with a class of lands stricken with a certain disqualification for partaking in the advantages of municipal expenditure by reason of the nature of the user of those lands—namely, either as being covered by water or being used solely as a canal or solely as a railway. And I may add that if I were considering the question as in 1848, I should have concluded that "lands" was used in the section in its ordinary and natural meaning, and not in the extended meaning which is given to it in questions of rating. I do not believe that the legislature had



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before it at that date the conception of a railway running on lands other than those which it had acquired for itself, and which were dedicated to the use of the railway properly so-called. But in 1875, when the existing Public Health Act was passed, the legislature must be taken to have been fully seized of the existence of tramways availing themselves of the public streets, and also to have been aware that, in the language of public statutes, these new constructions were always called by the special name of "tramways," and under such name were subject to special legislation. The fact that the word "railways" did not include "tramways" is, as I have said, recognised in the statute itself, and it would, in my opinion, be pushing the doctrine of tracing back the origin of sections in consolidating statutes too far if under such circumstances we were to hold that, in the Public Health Act, 1875, a different meaning ought to be given to the word "railways" in section 211 to that which it would naturally bear at that date.

If it were admissible to speculate as to the motives of the legislature in exempting railways from the full burden of the rates, I should be inclined to adopt the view expressed by Mr. Justice Earle in the case of *The South Wales Railway Company v. The Swansea Board of Health*. He there says: "The general scheme of the enactment is that the occupiers of the classes of property most benefited by the expenditure of the district rates shall be liable to be rated at a higher rate, the occupiers of the classes less benefited at the lower rate."

This fully accounts for the exemption of railways running on their own lands and partaking of few, if any, of the advantages of municipal expenditure so far as their line is concerned. But tramways are not in a like position. The public streets provide them not only with support for their rails, but also, as it were, with arrival and departure platforms, for they collect and deposit their passengers all along the route which they take. I can think of no class of property within a town which more directly, and to a fuller extent, reaps advantages from municipal expenditure, in the way of the construction, maintenance, lighting, and sewering of streets (which forms so large an item of municipal expenditure), in addition to its dependence on the general prosperity of the town, which is secured by municipal expenditure on other objects. Tramways seem to me so little *in pari casu* with land solely occupied for railways in the matter of meriting exemption from rates, that I have the greatest doubt whether any responsible authorities in 1875 would have proposed to exempt tramways from the full burden of rates, or if they had proposed it the legislature would have granted it. One cannot forget that in the year 1875 tramways were entirely in private hands, and there is no trace in the legislation of that period of any desire on the part of the legislature to put them in a favoured position.

One other argument of respondent's counsel must here be noted. It was argued with great elaboration that "tramway" etymologically fell under the denomination "railways" by reason of the fact that the cars run upon rails. In my opinion such arguments have little or no value. The meaning of words is fixed by usage, and if, as in my opinion is the case here, the two words "railway" and "tramway" had in popular and legislative usage distinct meanings, it makes no difference whatever whether those meanings flow from the etymological genesis of the words or not. When people spoke of tramways in 1875, there is, in my mind, no doubt that they meant something different from railways, and when the legislature used these two words in the two streams of legislation relating to railways and tramways, they recognised and followed this distinction of usage, and that is all that is necessary and sufficient for the purposes of construction of the relevant statutes.

Before passing to the events of 1896, and subsequently, which have, in my opinion, given rise to all the difficulties in this case, I must notice the case of *The Swansea Improvements and Tramway Company v. The Swansea Urban Sanitary Authority*, which was decided in 1892 by a Divisional Court of the Queen's Bench Division, consisting of Mr. Justice Wills and Mr. Justice Hawkins. This raised the precise point in issue in the present case. The tramway in that case was a tramway running through the streets of Swansea, which was continuous with what was known as the Oystermouth Railway, which was a railway constructed under the powers 44 George III. c. lv., upon land belonging to the company. It was admitted that the company were entitled to the exemption with regard to the Oystermouth Railway, but the sanitary authority contended that that exemption did not apply to the tramway. The court upheld this view. I entirely adopt the language of Mr. Justice Wills in his judgment in that case, where he says: "The objection which has been taken on the part of the Urban Sanitary Authority, and which, in my opinion, is a good one, is that tramways are something essentially different from railways, and that in the legislation of 1875 where railways are spoken of, they cannot possibly be supposed to include tramways. The legislature, when it passed that Act, did not think it necessary to define a tramway, and as definition is always *periculosæ plenum opus aleæ*, I shall follow the example of the legislature, and not attempt to define either railway or tramway. It appears sufficient to say that no ordinary person has any difficulty in distinguishing between the two. It seems to me, therefore, that the exemption in favour of railways cannot have been intended in the Act of 1875 to cover tramways."

The decision in this case remained unchallenged until it was overruled by the decision of the Court of Appeal, from which the present appeal is brought.

I now turn to the matters out of which, in my opinion, any difficulties that exist in the present case have arisen. In the year 1896 the legislature passed the Light Railways Act, 1896. Its full title was: "An Act to Facilitate the Construction of Light Railways in Great Britain." It established a board of three Commissioners, who were to receive applications for powers to construct light railways and to make Orders therefor, which upon confirmation by the Board of Trade were to have the same effect as if enacted by Parliament. With the exception of certain Acts specially named in the Act, and to any special provisions contained in the Order authorising the railway, it was provided that "the general enactments relating to railways shall apply to a light railway under this Act in like manner as they apply to any other railway." It is clear from this language and from the language of other portions of the Act that the legislature intended these light railways to be, and to be treated, as railways in the full sense of the word, though exempted from many of the obligations of railways, and entitled to special privileges. These special privileges were very great, and, indeed, if the Commissioners thought fit, they might make them exceptionally so, because the powers of the Commissioners with regard to the terms on which the railways should be authorised were subject to very few restrictions. In many ways these light railways were also exceptionally favoured. The Treasury might make loans for their construction, or even special advances in the nature of free grants. Persons with power, either by statute or otherwise, to sell and convey land for the railway might, with the sanction of the Board of Agriculture, do so wholly or partially without payment of its value. The provisions for assessing the compensation for lands compulsorily taken differed from those up to that time applicable to the compulsory acquisition of land, and were exceptionally favourable to the promoters of the railway, and in other respects the statute shows that the legislature intended to place these light railways in a highly-favoured position in order to stimulate their construction.

Now, there is not the slightest justification for viewing the Light Railways Act, 1896, as indicating or expressing any change of policy on the part of the legislature with regard to the treatment of tramways. It is evident, from a perusal of the Act, that what the legislature sought to facilitate thereby was the construction of railways for the purpose of opening out agricultural districts or other isolated centres of production, and bringing them into communication with the towns and the general railway system of the country. Unfortunately this, which is the plain object and intent of the Act, has not been adhered to. Tramway promoters were astute enough to see that undertakings which were purely and simply schemes for the construction of tramways in the ordinary sense of the word might be put forward under the guise of being schemes for light railways, and that if they could successfully elude the vigilance of the authorities they would thereby gain for the tramways the exceptional privileges intended only for undertakings of a widely different character. In this attempt they were only too successful, and by reason of what I have no hesitation in regarding as an abuse of the Act, schemes were sanctioned under the authority of the Light Railways Act, 1896, for the construction of what ought to have been regarded as tramways, and subjected to the carefully-considered conclusions of the legislature in respect thereto which are embodied in the Tramway Act.

The undertakings so sanctioned have secured irrevocably the status and privileges of light railways, however little they have merited it. But the lines to which the present case directly relates are not in this position, because they were constructed under Tramway Acts, and therefore it is only indirectly that this House is concerned with what has been done under the Light Railways Act, 1896. It has, however, become necessary for me to refer to that Act as I have done because of two decisions of this House upon which respondents' counsel relied strongly—namely, *The Blackpool and Fleetwood Tramway Company v. The Thornton Urban District Council*, and *The Wakefield and District Light Railways Company v. The Wakefield Corporation*, and I shall now proceed to examine these decisions.

In *The Blackpool and Fleetwood Tramway Company v. The Thornton Urban District Council*, the question to be decided was whether a tramroad which was placed on raised rails laid on sleepers, and was constructed on land the exclusive property of the company, and which was fenced off from adjoining land except at the level crossings of roads, was entitled as a "railway" to the benefit of the exemption. It was constructed under Acts which incorporated the Lands Clauses Act and large and important portions of the Railway Clauses Consolidation Act, 1845, and for the purposes thereof the tramroad in question was to be deemed a railway, and the company was to be deemed a railway company. So much for the nature and legal status of the tramroad. But the undertaking also included a tramway, and so far as that portion was concerned, and that only, certain provisions of the Tramway Act, 1870, were also incorporated. My only difficulty with regard to this case is how there could be any doubt that this tramroad was entitled to the exemption given by section 211 (1) (*b*) of the Public Health Act, 1875, on the ground of being a railway within the meaning of that section.

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Lord Macnaghten, who delivered the judgment of this House, deals with it very plainly and very briefly. He treats it as a case of *Res ipsa loquitur*. "Would anybody," he says, "seeing this road or way, or the photographs of it which are in evidence, call it anything but a railway?" He then points out that the Parliamentary powers under which it was constructed support its claim to the status of a railway, as they undoubtedly did. The only assistance that, in my opinion, this decision gives to your Lordships in the present case is that it is impossible to read Lord Macnaghten's opinion without realising that that eminent judge did not think that what is popularly known as a tramway was a railway, otherwise he would not have appealed to the photographs of the line or asked the question what it would ordinarily be called, nor would he have troubled himself as to the form of the statutes under which it had been constructed.

The case of *The Wakefield and District Light Railway Company v. The Wakefield Corporation* raised directly the difficulties caused by the use of the Light Railway Act, 1896, for the purpose of constructing mere tramways. The railway in that case was structurally and functionally a mere tramway, but the Court of Appeal and this House held (as they were compelled to do) that the line so constructed had the legal status of a railway, and must be treated as such. Its right to enjoy the exemption given to railways by section 211 (1) *(b)*, turned, therefore, on the answer to be given to the question whether the "land" which it occupied was occupied solely as a railway constructed under Act of Parliament for public conveyance. This House held that it was so, holding that the words above cited referred only to the user by the railway company, which of course was solely for the purpose of their railway. The same result might have been arrived at in another way. The "land" occupied by the tramway is only that portion of the soil which is occupied by its rails, etc., though no doubt it has the right of support from the subjacent land. I doubt whether any other person but the railway can be legally held to occupy the land taken up by the rails, etc., and therefore I do not think it would be legally incorrect to say that the "land" occupied by them was in fact exclusively occupied for that purpose—a construction which would avoid difficulties that might arise in other cases from reading into the proviso a meaning which would give to all occupiers of land the privilege or the exemption—provided only that so far as the land was occupied by a railway it was occupied by the railway company solely for the purposes of the railway. But however we arrive at it, the conclusion is the same—namely, that seeing that the light railway is a railway, and that it has no occupation of the public streets or the subjacent land save for the purpose of the railway, it is entitled to the exemption. This decision, however, cannot affect the present case, where the subject of taxation is not a railway, but a tramway, constructed under Acts which are specifically Tramway Acts, and subject to the privileges and disabilities given to tramways by the public legislation relating to them.

There remains only one head of argument—standing entirely by itself—which must be noticed, and which at first appeared to possess great weight. The Tramway Act, 1870, applies to Scotland. Now, the cases quoted on behalf of the respondents show that tramways in Scotland are valued by a functionary known as the railway and canal assessor, a fact which at first sight would appear to show that in Scotland tramways possess the legal status of railways, and are treated as such. If this were the case it would give weight to the contention that they ought to be so treated in England, and to enjoy the exemption as to rating granted to railways.

But when the matter is looked into more closely it assumes a very different appearance. The rateability of tramways in Scotland was established by a decision which rested not upon their being railways, but (as in England) upon their being in occupation of land. It is true that in consequence of that decision tramways came to be valued by the railway and canal assessor, but this did not imply that they were recognised as having the legal status of railways, because the functions of the railway and canal assessor are not confined to valuing railways and canals. He can be called upon to value water companies, gas companies, and any other concerns which traverse more local units than one, and seeing that he has such special experience, he is evidently the most suitable person to value such a subject as the continuous route of a tramway. But the matter in Scotland was put into a position still more widely different to that in which it stands in England by the Burgh Police Act, 1892, applicable only to Scotland, which, by section 347, expressly provides that railways and tramways *eo nomine* shall be entitled to the three-fourths reduction. This does not apply to counties where both railways and tramways are rated at their full value, nor does it apply to parishes where there is a power of classification of property subject to the rate which is not governed by any such rule, and inasmuch as the Act does not apply to England it is immaterial to the decision of the present case.

For all these reasons I am of opinion that in public legislation the word railway does not include tramway unless it is expressly made so to do by the terms of the Act. To hold otherwise would be to put tramways under the exclusive jurisdiction of the Railway and Canal Commissioners, a thing which has never been suggested during the 40 years of the existence of that court, and is obviously contrary to the intention of the legislature in creating it. The word "tramway" has had both popularly and legally a distinct meaning for at least 40 years, and although the action of the Light Railways Commissioners may have produced some confusion, and has certainly led to the exemption being obtained in cases in which it was not merited, this cannot affect a case like the present, where the subject of taxation is neither legally nor popularly a "railway." I am of opinion, therefore, that the appeal should be allowed, that the judgment of the Divisional Court should be restored, and that the respondents should pay to the appellants their costs here and in the court below.

The judgment of the Court of Appeal was, therefore, reversed, and the respondents were ordered to pay to the appellants their costs in the House of Lords and in the court below.

## CROYDON AND OMNIBUS COMPETITION.

PROBABILITY OF RATE-AID NEXT YEAR—REQUEST FOR LEGISLATION.

Mr. T. B. Goodyer (manager of the Croydon Corporation Tramways) has forwarded to over 70 members of Parliament representing constituencies in and adjacent to the metropolitan area, and also to the members of the Parliamentary Labour Party, copies of the resolution unanimously passed by the Croydon Corporation, urging the Government to pass such legislation as will place motor omnibus companies on terms of equality with regard to public obligations with the municipal tramways authorities. The letter also states:

The municipal tramways authorities in the area named have expended, practically, 13½ millions of pounds on their undertakings, and when I tell you that next year there is every probability that each undertaking will require aid from the rates—instead of being self-supporting, as hitherto—you will, I trust, readily see how very serious the present outlook is for those ratepayers in the metropolitan area whose tramways are municipally owned. The metropolitan tramways managers desire, not that their undertaking shall have any preferential treatment, but that motor omnibus operators should be placed on terms of equality with regard to the public burdens now borne by the tramways in the area named. May I express the hope that it will be possible in the interest of the ratepayers concerned—for you, and the party you represent, to co-operate with other Parliamentary representatives in urging the Government to pass such legislation as will prevent the already over-taxed ratepayer from being further burdened?

Enclosed with the letter was the following extract from Mr. Goodyer's report on the Croydon tramways for the year ended March 31, 1913:

COMPARISON OF PUBLIC BURDENS BORNE BY TRAMCARS AND MOTOR OMNIBUSES IN CROYDON.

| Items. | Car. | Omnibus. |
|---|---|---|
| | £ s. d. | £ s. d. |
| Licence duties ... ... ... ... ... | 2 15 0 | 5 18 0 |
| Rates on track ... ... ... ... ... | 43 8 9 | — |
| Maintenance of road ... ... ... ... | 92 11 9 | — |
| Petrol tax ... ... ... ... ... | — | 43 0 0 |
| Total ... ... ... | £138 15 6 | £48 18 0 |

In addition to the above payments, the Croydon cars for the past year have contributed £3,000 towards the rates, or an average per car of £51 14s. 6d., thus making the sum of £190 10s. per car run, or a gross total of £11,095 16s. 7d. as a contribution to the local revenue, while the contribution of the 'buses is *nil*.

ADDITIONAL NOTES RELATING TO LOCAL EXPENDITURE BY CROYDON CARS FOR THE YEAR ENDED MARCH 31, 1913.

The amount paid in wages was £32,264 (including the wages paid to permanent way men in roads department), or 35·63 per cent. of the revenue earned (£90,543).

Out of every 20s. earned 7s. 1½d. has been spent in wages.

No doubt the greater part of this sum would be expended locally in house rent, tradespeople, etc.

The permanent way expenses and the rates and taxes represent respectively 5·93 per cent. and 2·61 per cent. of the revenue earned.

HOW TRAMCARS IN THE METROPOLITAN AREA ARE HANDICAPPED IN COMPARISON WITH THE OMNIBUSES.

| | Tramcars. | Omnibuses. |
|---|---|---|
| Control ... | Only permitted to run on routes sanctioned by Parliament. | Free to go anywhere at their option. |
| Track ... ... | Provided and maintained by the system. Damage done by motor 'buses and other traffic repaired at cost of trams. | Provided and maintained by the rates. Repairs paid for by the general ratepayer. |
| Workpeople's fares. | On all routes ... ... ... | None. |
| Rates on track | Pays rates on track ... ... | None. |

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It will be observed from the foregoing that omnibuses operate under conditions of unmatched freedom from every point of view. A tramway, which is a statutory undertaking, constructed under conditions necessitating a heavy capital expenditure—afterwards, burdened by yearly charges, and having to comply with the Board of Trade conditions—is heavily handicapped in having to compete with another system, contributing largely towards the wear and tear of the various roads in the borough over which it runs, but making no payment *whatever* towards the maintenance of such roads, or local burdens. Tramways, also, are under statutory obligations to provide exceptionally cheap fares for their workpeople's services, thereby benefiting employers as well as employees. The provision of such facilities, in all cases, may be said to result in a serious loss. The motor omnibus has no obligation to give similar facilities—yet which are requisite—has no legal liabilities in connection with road maintenance, and is subject to no rates other than those for buildings and garages which are occupied. Those who use the roads for the benefit of shareholders should pay for the upkeep of those roads Tramways pay more than their fair share of the cost of road maintenance by reason of the obligation that rests upon them to make good and maintain the permanent way, which they only technically "use," and the width of the paving each side of the track. In addition, they are also called upon to pay the equivalent of a rent for the use of the roads in the shape of a substantial contribution for rating.

Legislation, therefore, in the interests of the ratepayers and those municipal authorities in the metropolitan area who have invested 13½ millions of pounds in their tramway undertakings is very urgently required, so that services provided by the community, at the cost of the community and in the interests of the community, should not be in a *less* favourable position than other competitive means of transport. Fortunately, valuable precedents in respect of contributions towards road maintenance by the operation of motor omnibuses and trackless trolley vehicles, have already been established in the following instances. Mr. Goodyer here cites the Chesterfield Corporation's Motor Omnibus and Trackless Trolley Bill and the Rhondda Tramways Company's Trackless Trolley Bill dealt with in May last. In the first case a House of Commons Committee required a clause to be inserted in the bill in order to render the Corporation "liable for damage arising out of the extraordinary traffic proposed by the bill, such damage to be assessed, at the end of three years, by arbitration." In the Rhondda bill a clause was inserted requiring the promoters "to pay a fixed sum per car-mile towards the maintenance of the roads upon which such vehicles shall be run."

The question of principle having at last been determined, as in the cases mentioned, the matter should, obviously, Mr. Goodyer states, be carried a step further and applied to the metropolitan area, where the local authorities have no control over the licensing of public vehicles.

## NEW AND PROSPECTIVE WORK.

BELFAST.—The Corporation have decided to apply to the Local Government Board for sanction to a loan of £35,000 for the extension of the electricity undertaking.

CALCUTTA.—In reply to a request by Calcutta Council for extension to the tramways in five directions in the southern part of the city, the Tramways Company have stated they understand that the Calcutta Improvement Trust have under consideration several schemes for the widening of the existing, and opening out of new roads, and are dealing with the question of the future expansion of the city generally. The company suggested that the proposals of the Corporation should be referred to the trust for an expression of opinion as to the advisability of constructing the tramway extensions referred to. The Council resolved to press the proposals upon the attention of the Improvement Trust in view of the provisions in their Act enabling them to subsidise tramway companies.

CARDIFF.—On the recommendation of Mr. A. Ellis, the electrical engineer and tramways manager, the Finance Committee have advised the Corporation to borrow £30,000 for the purpose of purchasing new plant and machinery at the power-station.

SOUTH SHIELDS.—The Town Council have adopted a recommendation to borrow £30,000 for the purpose of installing a new generator set and other plant at the electricity works.

WELLINGTON. — The tramways department's estimate for the current year provide for an expenditure of £34,800 on new works, including £9,264 for new cars, £5,020 for a new boiler and other plant for the power station, and £5,164 for car shed extension.

WEST HARTLEPOOL.—A plan for an extension to the tramway car shed has been adopted, and the manager has drawn up a memorandum for the approval of Mr. J. F. C. Snell, the consulting engineer, of suggested alterations and renewal of plant. On July 2 the Council approved of the suggested alterations to the car shed, the purchase of four new cars, and a rail-grinding equipment On the preceding day a Local Government Board inquiry was held into an application to borrow £4,300 for the purchase of new plant for the electricity works in connection with the supply of current to the tramways.

## FINANCIAL REPORTS AND MEETINGS.

**Millar's Timber and Trading Company.** The directors recommend a dividend of 5 per cent. on the ordinary shares.

**Provincial Tramways Company.**—The board have declared an interim dividend of 8d. per share on the ordinary shares for the past half-year.

**Blackpool and Fleetwood Tramroad Company, Limited.**—The board have declared an interim dividend at the rate of 4 per cent. per annum.

**Mexico Tramways.**—The directors have declared a dividend of 1¾ per cent. on the issued capital stock of the company, payable August 1 to shareholders of record July 12.

**Torquay Tramways Successful Working.**—For the first half of the year the traffic returns of the Torquay Tramways Company show an advance of £1,200 over the corresponding period last year.

**Chatham and District Light Railways.**—The following dividends are recommended by the directors for the half-year ended June 30: At the rate of 5 per cent. per annum on preference shares, and at the rate of 3 per cent. per annum on ordinary shares.

**Dublin United Tramways Dividend.**—Ad interim dividends at the rate of 6 per cent. per annum, less income tax, on the preference shares, and at the rate of 6 per cent. per annum, less income tax, on the ordinary shares for the half year to June 30 have been declared.

**The Railless Trolley Service at Bradford.**—The railless trolley car installation on the outskirts of Bradford produced an income for the year ended March 31 of £1,233, representing 7d. per car-mile; while the expenditure (£1,613) represented 9d. per car-mile. There was therefore a deficit of £380, or of 2d. per car-mile run. It is pointed out, however, by the city treasurer that the railless section is a feeder of the general tramways system and contributes to some extent to its profits.

**Electric Construction Company.**—At the annual meeting of the Electric Construction Company in London, on July 15, Mr. P. E. Beechcroft, who presided, said the net profit had increased from £20,364 to £27,500. Their works had been fully employed, and better prices had prevailed. They had been able to handle an increased output at comparatively little additional cost in the way of fixed factory charges. It was proposed to pay a dividend of 5 per cent. on the ordinary shares, and transfer £10,690 to the reserve, leaving to be carried forward £6,899. The report was adopted.

**London Electric Railway Dividends.**—For the past half-year: Metropolitan District, at the rate of 2½ per cent. per annum on the 5 per cent. second preference stock; London Electric Railway, at the rate of 1 per cent. per annum on the ordinary stock; Central London, at the rate of 3 per cent. per annum on undivided ordinary stocks, and at the rate of 4 per cent. per annum on the prefered ordinary stock; City and South London, at the rate of ¼ per cent. per annum on the ordinary stock; Underground Electric Railways, full distribution on the income bonds at the rate of 6 per cent. per annum.

**Cape Town Consolidated Tramways and Land.**—A balance of £1,678 is shown to the debit of profit and loss account for the current year, which, added to the balance brought forward from 1911 of £4,628, makes a total of £6,306 to be carried forward. No dividends have been declared by the subsidiary companies during the past year. The Camps Bay Tramway Company shows a profit of £2,973 for the same period. The Cape Provincial Government has taken the initiative in formulating a scheme for the unification of the municipalities of the Cape Peninsula—such unification will, in all probability, embrace Camps Bay. The whole matter is now under negotiation.

**The Purchase of Perth (W.A.) Electric Tramways.**—At an extraordinary meeting of the Perth Electric Tramways, Limited, Mr. O. Wethered presiding, the shareholders passed a resolution winding up voluntarily, to enable the directors to carry out the sale of the property to the Government. The chairman said there would be no difficulty in at once making a distribution, probably £1 per share, the distribution of the balance of the assets following as soon as the necessary details of the liquidation are carried out. Mr. Stoneham, the chairman, who seconded, said that the Government had made a good bargain, and as they had raised the loan at a little over 4 per cent., if they carried on the tramway as the company had carried it on, they would no doubt be receiving something like 10 per cent. upon their money.

**A Record Year at Birkenhead.**—Mr. Cyril Clarke, acting tramways manager for Birkenhead, in his annual report, states that all previous records as regards passengers carried, traffic receipts, and net profit, had been broken. The traffic receipts showed an increase of £1,908 over the previous year, which was gratifying considering that the year ending March, 1912, showed an increase of £2,565. The net profit of £4,301 had been placed to renewals fund account. The amount to the credit of this account was now £18,070, equivalent to

*(Continued on page 129.)*

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Year Ended. | Electric Traction Inaugurated. | System. | Line open (single track). Mls. | Chs. | Borrowing Powers. | Borrowing Powers Exercised. | Unexhausted Borrowing Powers. | Total Capital Expenditure. | Capital Expenditure per Mile of Single Track. | Loans Outstanding. | Loans Repaid and Sinking Fund. | Depreciation, Renewal and Reserve Funds. | Gross Receipts. Traffic. | Other. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aberdeen | †May 31, 1913 | Dec., 1899 | E. | 27 | 66 | 350,000 | .. | ... | 350,590 | 12,599 | 192,660 | 157,929 | 143,468 | 79,125 | 1,041 | 80,166 |
| Accrington | †Mar. 31, 1913 | Aug., 1907 | ,, | 10 | 53 | 169,675 | 134,670 | 35,800 | 134,525 | 12,619 | 116,976 | 17,694 | 13,200 | 27,419 | 403 | 27,822 |
| Ashton-u-Lyne | *Mar. 25, 1912 | Aug., 1902 | ,, | 8 | 15 | 130,070 | 108,099 | 21,971 | 108,099 | 13,203 | 83,240 | 24,859 | 1,650 | 21,340 | 551 | 21,891 |
| Ayr | *May 15, 1912 | Sept., 1901 | ,, | 7 | 49 | 128,000 | 74,405 | 53,595 | 82,914 | 10,892 | 64,417 | 16,078 | 14,028 | 15,092 | 660 | 15,752 |
| Birmingham | †Mar. 31, 1913 | Jan., 1904 | ,, | 108 | 32 | 2,302,001 | 2,089,194 | 212,807 | 1,981,588 | 18,280 | 1,874,109 | 215,084 | 220,369 | 574,248 | 7,318 | 581,566 |
| Blackburn | †Mar. 25, 1913 | Mar., 1899 | ,, | 24 | 63 | 408,174 | 342,474 | 65,700 | 334,924 | 13,512 | 254,600 | 167,381 | 1,000 | 63,440 | 3,243 | 66,683 |
| Blackpool | *Mar. 31, 1912 | June, 1899 | ,, | 21 | 31 | 438,028 | 294,483 | 143,545 | 295,984 | 13,839 | 294,483 | 102,855 | 16,259 | 64,313 | 1,027 | 65,340 |
| Bolton | †Mar. 31, 1913 | Dec., 1899 | ,, | 47 | 17 | 552,208 | 551,019 | 1,189 | 559,107 | 11,842 | 338,439 | 162,580 | 55,901 | 135,149 | 1,313 | 136,462 |
| Bradford | *Mar. 31, 1912 | July, 1898 | ,, | (h)101 | 74 | 1,269,568 | 978,063 | 291,505 | 965,366 | 9,471 | 635,883 | 355,633 | 75,120 | 274,328 | 15,007 | 289,335 |
| Brighton | †Mar. 31, 1913 | Nov., 1901 | ,, | 17 | 15 | 358,620 | 279,000 | 80,715 | 277,914 | 16,170 | 223,556 | 55,653 | 6,708 | 51,780 | 2,018 | 53,798 |
| Burnley | †Mar. 31, 1913 | Dec., 1901 | ,, | 22 | 13 | 388,052 | 339,125 | 48,927 | 231,601 | 10,450 | 179,498 | 56,652 | 48,212 | 79,641 | 249 | 79,890 |
| Burton-on-Trent | †Mar. 31, 1913 | Aug., 1903 | ,, | 9 | 60 | 108,632 | 104,562 | 4,070 | 106,225 | 10,895 | 50,583 | 53,979 | 8,966 | 14,383 | 1,304 | 15,687 |
| Bury | †Mar. 31, 1913 | June, 1903 | ,, | 21 | 14 | 407,800 | 280,775 | 127,025 | 283,005 | 13,365 | 262,135 | 42,877 | (l)24,571 | 67,370 | 284 | 67,654 |
| | | | | (b)13 | 21 | | | | | | | | | | | |
| Chester | *Mar. 25, 1912 | April, 1903 | ,, | 6 | 35 | 92,991 | 82,380 | 10,611 | 82,934 | 12,883 | 71,027 | 11,490 | 1,998 | 12,343 | 477 | 12,820 |
| Chesterfield | *Mar. 31, 1912 | Dec., 1904 | ,, | 5 | 8 | 95,000 | 70,500 | 24,500 | 69,575 | 13,642 | 60,289 | 10,211 | 5,031 | 11,709 | 496 | 12,205 |
| Colchester | †Mar. 31, 1913 | July, 1904 | ,, | 7 | 75 | 70,748 | 69,555 | 1,193 | 69,401 | 8,743 | 53,425 | 17,049 | Nil. | 10,281 | 477 | 10,758 |
| Croydon | †Mar. 31, 1913 | June, 1906 | ,, | 19 | 10 | 287,689 | 287,689 | Nil | 284,847 | 14,894 | 230,968 | 87,264 | 42,453 | 90,543 | 1,921 | 92,464 |
| Darlington | †Mar. 31, 1913 | June, 1904 | ,, | 8 | 71 | 107,500 | 76,263 | 31,237 | 76,322 | 8,587 | 56,888 | 19,434 | 5,726 | 11,842 | 334 | 12,176 |
| Darwen | *Mar. 31, 1912 | Oct., 1900 | ,, | 7 | 13 | 93,400 | 86,300 | 7,100 | 85,748 | 11,972 | 60,670 | 25,718 | 6,400 | 14,530 | 241 | 14,771 |
| Derby | *Mar. 31, 1912 | July, 1904 | E. | 22 | 5 | ... | ... | ... | 242,476 | 10,999 | 191,798 | 50,678 | (a)4,005 | E46,388 | 975 | 47,363 |
| | | | H. | ... | | ... | ... | ... | ... | ... | ... | ... | ... | H 407 | 18 | 425 |
| Doncaster | *Mar 31, 1912 | June, 1902 | E. | 11 | 62 | 103,900 | 94,500 | 9,400 | 95,025 | 8,070 | 82,400 | 13,020 | 27 | 17,417 | 252 | 17,669 |
| Dundee | *May 15, 1912 | July, 1900 | ,, | 27 | 38 | ... | 341,416 | ... | 349,854 | 12,734 | 266,161 | 77,173 | 60,984 | 62,016 | 664 | 62,680 |
| East Ham | *Mar. 31, 1912 | June, 1901 | ,, | 14 | 32 | 189,524 | 187,073 | 2,451 | ... | 191,260 | . | 50,374 | ... | 57,342 | 668 | 58,010 |
| Exeter | †Mar. 31, 1913 | April, 1905 | ,, | 7 | 0 | 106,000 | 86,111 | 19,889 | 86,111 | 12,301 | 69,376 | 17,209 | 5,915 | 16,748 | Nil | 16,748 |
| Gloucester | *Mar 31, 1912 | April, 1904 | ,, | 15 | 2 | 191,000 | 144,243 | 46,757 | 147,692 | 9,846 | 113,280 | 14,587 | ... | 15,894 | 1,108 | 17,002 |
| Halifax | †Mar. 31, 1913 | June, 1898 | ,, | 54 | 70 | 449,263 | 412,876 | 36,387 | 414,246 | 7,549 | 299,480 | 108,802 | 28,810 | 104,947 | 1,026 | 105,973 |
| Ilford | *Mar. 31, 1912 | Mar., 1903 | ,, | 11 | 28 | 149,633 | 149,633 | Nil | 149,136 | 13,140 | 114,806 | 34,827 | 7,648 | 27,294 | 2,272 | 29,566 |
| Ilkeston | *Mar. 31, 1912 | May, 1903 | ,, | 4 | 24 | 64,214 | 47,000 | 15,074 | 47,936 | 11,148 | 42,600 | 11,919 | 350 | 6,533 | 156 | 6,689 |
| Ipswich | †Mar. 31, 1913 | Nov., 1903 | ,, | 14 | 70 | 116,471 | 114,300 | 2,171 | 114,838 | 7,720 | 98,858 | 16,305 | 8,180 | 22,575 | 829 | 23,404 |
| Keighley | *Mar. 31, 1912 | Oct., 1904 | ,, | 6 | 9 | 50,934 | 46,903 | 4,031 | 46,903 | 7,675 | 34,465 | 15,080 | 1,310 | 9,588 | 251 | 9,839 |
| Kilmarnock | *May 15, 1912 | Dec., 1904 | ,, | 5 | 47 | 65,000 | 48,246 | 16,754 | 52,666 | 9,426 | 48,205 | 6,090 | 2,749 | 8,400 | 237 | 8,637 |
| Kirkcaldy | †May 15, 1913 | Feb., 1903 | ,, | 8 | 45 | 213,000 | 96,748 | 116,252 | 96,749 | 11,025 | 80,333 | 16,415 | 4,161 | 15,712 | 494 | 16,206 |
| Lancaster | †Mar. 31, 1913 | Jan., 1903 | ,, | 4 | 65 | 60,000 | 51,550 | 8,450 | 43,432 | 9,022 | 36,200 | 13,838 | 3,000 | 5,437 | 143 | 5,580 |
| Leith | *May 15, 1912 | Aug., 1905 | ,, | 17 | 73 | 275,000 | 235,000 | 40,000 | 235,000 | 13,119 | 193,200 | 42,257 | 302 | 33,851 | 842 | 34,693 |
| Leyton | *Mar. 31, 1912 | Dec., 1906 | ,, | 18 | 40 | 306,427 | 305,821 | 606 | 295,526 | 15,977 | 256,643 | 40,906 | 3,360 | 61,496 | 1,172 | 62,668 |
| Lincoln | †Mar. 31, 1913 | Nov., 1905 | S. | 2 | 77 | 98,519 | 44,947 | 53,572 | 44,992 | 15,187 | 42,893 | 9,862 | (a) 1,600 | 6,717 | 128 | 6,845 |
| Liverpool | *Dec. 31, 1912 | Nov., 1898 | E. | 119 | 0 | ... | ... | ... | 2,015,193 | 16,934 | 1,245,282 | 1,012,873 | 430,509 | 631,071 | 13,103 | 644,174 |
| Lowestoft | *Sep. 30, 1912 | July, 1903 | ,, | 4 | 6 | 94,230 | 87,031 | 7,199 | 87,031 | 21,357 | 67,833 | 13,067 | ... | 10,781 | 17 | 10,798 |
| Maidstone | *Mar. 31, 1912 | July, 1904 | ,, | 7 | 3 | 82,932 | 82,582 | 350 | 78,748 | 11,012 | 69,158 | 13,424 | Nil. | 9,279 | 518 | 9,797 |
| Manchester | †Mar. 31, 1913 | June, 1901 | ,, | 188 | 30 | 2,355,689 | 2,034,371 | 321,318 | 2,061,791 | 10,945 | 1,543,504 | 437,305 | 479,683 | 876,023 | 11,624 | 887,647 |
| Nelson | †Mar. 31, 1913 | Feb., 1903 | ,, | 3 | 69 | 38,000 | 37,832 | 168 | 37,832 | 9,795 | 30,118 | 7,714 | ... | 10,240 | 51 | 10,291 |
| Newport (Mon.) | *Mar. 31, 1912 | April, 1903 | ,, | 14 | 35 | 219,250 | 193,250 | 26,000 | 192,934 | 13,363 | 166,653 | 35,432 | 9,958 | 36,361 | 821 | 37,182 |
| Nottingham | †Mar. 31, 1913 | Jan., 1901 | ,, | 37 | 40 | 730,300 | 725,945 | 4,355 | 638,005 | 17,479 | 426,818 | 217,041 | 64,242 | 164,746 | 2,404 | 167,150 |
| Oldham | *Mar. 25, 1912 | May, 1902 | ,, | 27 | 67 | 516,922 | 436,704 | 80,219 | 441,047 | 15,395 | 333,746 | 113,339 | (a) 1,419 | 101,280 | 819 | 102,099 |
| | | | | (b) 8 | 31 | | | | | | | | | | | |
| Perth | *May 15, 1912 | Nov., 1905 | ,, | 6 | 40 | 90,000 | 77,650 | 12,350 | 77,829 | 11,539 | 64,790 | 13,678 | 1,034 | 9,689 | 412 | 10,101(e) |
| Plymouth | *Mar. 31, 1912 | Sept., 1899 | ,, | 15 | 0 | ... | 188,752 | ... | 157,322 | ... | 92,636 | 97,320 | 10,848 | 37,083 | 830 | 37,913 |
| Pontypridd | *Mar. 31, 1912 | Mar., 1905 | ,, | 8 | 48 | 136,019 | 135,885 | 134 | 136,896 | 15,919 | 112,862 | 22,899 | ... | 21,130 | 2,036 | 23,166 |
| Rawtenstall | *Mar. 31, 1912 | May, 1909 | ,, | 15 | 71 | 196,159 | 182,933 | 13,226 | 181,036 | 11,401 | 169,971 | 12,962 | 2,150 | 24,063 | 1,018 | 25,081 |
| Rochdale | *Mar. 31, 1912 | May, 1902 | ,, | (i) 40 | 2 | 356,991 | 347,782 | 9,209 | 351,831 | 15,347 | 347,782 | 71,729 | ... | 72,649 | 353 | 73,002 |
| Rotherham | *Mar. 31, 1912 | Jan., 1903 | ,, | 12 | 0 | 228,550 | 155,000 | 73,550 | 154,589 | 12,882 | 132,835 | 46,413 | 18,123 | 35,724 | 133 | 35,857 |
| Salford | *Mar. 31, 1912 | Oct., 1901 | ,, | 75 | 0 | 1,050,666 | 723,669 | 326,997 | 723,324 | 9,644 | 581,149 | 237,090 | 48,964 | 253,962 | 70 | 254,032 |
| Southampton | *Mar. 31, 1912 | Jan., 1900 | ,, | 17 | 62 | 277,259 | 239,715 | 37,544 | 247,977 | 13,951 | 169,010 | 70,726 | 18,497 | 63,849 | 2,260 | 66,109 |
| Southend-on-Sea | †Mar. 31, 1913 | July, 1901 | ,, | 11 | 49 | 130,000 | 129,961 | 39 | 143,808 | 12,384 | 116,940 | 12,784 | 3,045 | 34,453 | 465 | 34,918 |
| Southport | Mar. 31, 1912 | July, 1900 | ,, | (d) 10 | 63 | 292,000 | 196,500 | 95,500 | 118,708 | 11,004 | ... | .. | 417 | 18,642 | 402 | 19,044 |
| South Shields | †Mar. 31, 1913 | Mar., 1906 | ,, | 10 | 21 | 251,883 | 174,936 | 76,947 | 172,476 | 16,806 | 150,228 | 30,818 | 20,838 | 33,654 | 498 | 34,152 |
| Stalybridge, H., M., D. | †Mar. 31, 1913 | May, 1904 | ,, | 27 | 57 | 325,270 | 274,990 | 44,280 | 279,778 | 10,096 | 224,700 | 56,290 | 500 | 34,961 | 677 | 35,638 |
| Stockport | *Mar. 31, 1912 | Aug., 1902 | ,, | 27 | 50 | 305,028 | 234,500 | 70,528 | 238,199 | 8,623 | 176,002 | 58,498 | 54,219 | 59,594 | 1,245 | 60,839 |
| Sunderland | †Mar. 31, 1913 | Aug., 1900 | ,, | 20 | 28 | 308,699 | 303,211 | 5,488 | 305,234 | 14,999 | 182,318 | 111,943 | 31,883 | 68,507 | 364 | 68,871 |
| Wallasey | *Mar. 31, 1912 | Mar., 1902 | ,, | 19 | 69 | 192,546 | 191,249 | 1,297 | 210,671 | 10,606 | 167,586 | 53,395 | 10,544 | 57,337 | 770 | 58,107 |
| Walsall | *Dec. 31, 1912 | Dec., 1902 | ,, | 19 | 44 | 188,145 | 188,100 | 45 | 183,351 | 9,378 | 156,161 | 31,939 | 30,879 | 30,629 | 800 | 31,429 |
| Walthamstow | *Mar 31, 1912 | June, 1905 | ,, | 12 | 42 | 180,000 | 180,000 | Nil | 173,081 | 13,846 | 163,679 | 16,321 | 2,757 | 38,249 | 741 | 38,990 |
| Warrington | †Mar. 31, 1913 | April, 1902 | ,, | 9 | 52 | 103,674 | 102,896 | 778 | 102,128 | 10,583 | 73,830 | 29,068 | 10,000 | 22,903 | 302 | 23,205 |
| West Ham | †Mar. 31, 1913 | Feb., 1904 | ,, | 30 | 4 | 563,478 | 551,463 | 12,015 | 556,878 | 18,532 | 539,650 | 90,402 | 40,352 | 137,766 | 676 | 138,442 |
| Wigan | †Mar. 31, 1913 | April, 1901 | ,, | (k) 34 | 42 | ... | ... | ... | ... | ... | ... | ... | ... | 71,268 | 1,515 | 72,783 |
| Wolverhampton | †Mar. 31, 1913 | April, 1902 | S. | 21 | 40 | 279,733 | 265,616 | 14,117 | 278,615 | 12,959 | 217,882 | 47,734 | 50,220 | 53,963 | 797 | 54,760 |
| Yarmouth (Gt.) | †Mar. 31, 1913 | June, 1902 | E. | 14 | 32 | 144,500 | 119,750 | 24,750 | 121,899 | 8,465 | 111,450 | 22,737 | 6,070 | 23,625 | 508 | 24,133 |

## TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | †Mar. 31, 1913 | Nov., 1905 | E. | 98 | 54 | 1,567,674 | 1,386,232 | 181,442 | 1,389,713 | 14,037 | 1,381,200 | 144,342 | 117,769 | 250,589 | 3,788 | 254,377 |
| Bexley | *Mar. 31, 1912 | Oct., 1903 | ,, | 6 | 42 | 99,942 | 96,984 | 2,958 | 96,924 | 14,854 | 78,800 | 18,184 | (j) 1,074 | 13,826 | 1,542 | 15,368 |
| Birkenhead | †Mar. 31, 1913 | Feb., 1901 | ,, | 24 | 7 | 375,848 | 364,854 | 10,994 | 366,610 | 15,220 | 247,012 | 117,863 | 18,070 | 61,202 | 4,365 | 65,567 |
| Bournemouth | *Mar. 31, 1912 | July, 1902 | ,, | (e) 29 | 62 | 449,027 | 434,462 | 14,565 | 438,194 | 19,601 | 341,688 | 113,617 | 5,656 | 91,422 | 233 | 91,655 |
| Cardiff | *Mar. 31, 1912 | May, 1902 | ,, | 31 | 66 | 813,923 | 787,292 | 26,631 | 783,051 | 24,683 | 583,869 | 203,422 | 86,411 | 125,743 | 19,181 | 144,924 |
| Glasgow | †May 31, 1913 | Oct., 1898 | ,, | 193 | 47 | 3,714,266 | 3,553,584 | 160,682 | 3,694,143 | 18,595 | 2,479,408 | 1,074,177 | 2,079,645 | 1,007,653 | 3,891 | 1,011,544 |
| | | | | (b) 2 | 52 | | | | | | | | | | | |
| Huddersfield | †Mar. 31, 1913 | Feb., 1901 | ,, | 46 | 0 | 646,284 | 407,142 | 239,142 | 417,408 | 9,074 | 255,177 | 161,349 | 19,132 | 106,586 | 3,123 | 109,709 |
| Hull | †Mar. 31, 1913 | July, 1899 | ,, | 30 | 44 | 677,673 | 541,871 | 135,802 | 542,371 | 17,753 | 527,641 | 147,925 | 125,407 | 157,048 | 1,393 | 158,441 |
| Leeds | †Mar. 31, 1913 | Aug., 1897 | ,, | 112 | 62 | 1,603,455 | 1,546,422 | 57,033 | 1,511,588 | 13,406 | 1,220,041 | 482,698 | 4,637 | 407,552 | 3,979 | 411,531 |
| Leicester | *Dec. 31, 1912 | May, 1904 | ,, | 37 | 0 | 739,240 | 719,223 | 20,017 | 722,021 | 19,514 | 607,476 | 129,211 | 100,000 | 134,966 | 12,705 | 147,671 |
| London | *Mar. 31, 1912 | ... | H. | 23 | 30 | ... | ... | ... | ... | ... | ... | ... | ... | 60,357 | 1,335 | 61,692 |
| | | May, 1903 | C.E. | 255 | 60 | (c) | (c) | (c) | 11,850,127 | ... | 11,309,789 | 2,423,040 | 920,402 | 2,231,902 | 62,587 | 2,294,489 |
| N'castle-on-Tyne | *Mar. 31, 1912 | Dec., 1901 | E. | 60 | 20 | 1,520,425 | 1,199,962 | 320,463 | 1,176,339 | 19,574 | 932,552 | 342,271 | 104,670 | 216,590 | 10,044 | 226,634 |
| Northampton | †Mar. 31, 1913 | July, 1904 | ,, | 9 | 13 | 239,800 | 127,255 | 112,545 | 135,481 | 14,786 | 91,176 | 36,078 | 10,499 | 27,250 | 899 | 28,149 |
| Portsmouth | *Mar. 31, 1912 | Sep., 1901 | ,, | 30 | 66 | 640,011 | 682,319 | .. | 696,792 | 22,599 | 471,739 | 210,580 | 85,307 | 110,792 | 1,810 | 112,602 |
| Preston | *Mar. 31, 1912 | June, 1904 | ,, | 17 | 16 | 224,101 | 187,269 | 36,832 | 187,269 | 10,888 | 129,765 | 37,200 | 31,466 | 40,355 | 292 | 40,647 |
| Reading | *Mar. 31, 1912 | July, 1903 | ,, | 13 | 14 | 235,000 | 232,000 | 3,000 | 227,430 | 17,262 | 174,040 | 51,582 | 14,651 | 33,151 | 1,119 | 34,270 |
| Sheffield | †Mar 25, 1913 | Sep., 1899 | ,, | 77 | 67 | 1,727,596 | 1,413,980 | 313,616 | 1,411,959 | 18,140 | 1,067,897 | 418,292 | 27,521 | 358,656 | 3,189 | 361,845 |
| Wellington, N.Z. | *Mar. 31, 1912 | ... | ,, | 30 | 7 | 538,523 | 538,523 | Nil | 605,798 | 20,189 | 538,523 | 36,008 | 87,561 | 138,229 | 481 | 138,710 |

C = Electric conduit system. E = Electric trolley system. H = Horse lines. S = Surface contact system. (a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed (d) Car depot extensions. (e) Includes 7 mi. 34·53 chs. single track lines leased. (g) District fund widening streets. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased. (j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance. (m) Includes £306 profit on motor char-a-banc. † Reports inserted for the financial year 1912-13.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Working Expenses. | | | | | Gross Profit on Working. | Additions to Gross Profit. | Deductions from Gross Profit. | | | | | Net Surplus + or Deficit − |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traffic. | General. | Repairs & Maintenance. | Power. | Total. | | | Interest. | Sinking Fund. | Income Tax. | Depreciation & Renewal | Sundries. | Total. | |
| Aberdeen | 20,710 | 9,404 | 5,954 | 7,138 | 43,206 | 36,960 | 472 | 6,839 | 4,661 | ... | 13,407 | ... | 24,907 | + 12,525 |
| Accrington | 6,839 | 1,870 | 2,102 | 4,644 | 15,455 | 12,367 | ... | 4,000 | 3,693 | 127 | ... | ... | 7,820 | + 4,553 |
| Ashton-und'r-Lyne | 4,699 | 1,715 | 2,358 | 3,225 | 11,997 | 9,894 | ... | 2,814 | 3,536 | 440 | 750 | (1,004 | 8,544 | + 1,350 |
| Ayr | 3,403 | 1,959 | 1,383 | 1,925 | 8,670 | 7,082 | ... | 2,100 | 1,669 | 132 | 1,966 | 128 | 5,995 | + 1,249 |
| Birmingham | 160,277 | 40,898 | 68,278 | 100,726 | 370,179 | 211,387 | 11,479 | 65,672 | 49,946 | ... | ... | 5,896 | 121,514 | +101,352 |
| Blackburn | 14,863 | 4,262 | 12,392 | 10,999 | 42,518 | 24,167 | 110 | 5,292 | 14,909 | 206 | ... | ... | 20,407 | + 3,870 |
| Blackpool | 14,325 | 4,758 | 12,889 | 8,262 | 40,234 | 25,106 | ... | (h) 8,721 | 6,332 | ... | 5,053 | ... | 20,106 | + 5,000 |
| Bolton | 29,821 | 8,646 | 15,984 | 19,767 | 74,218 | 62,244 | 1,114 | h)11,189 | 17,197 | 1,095 | 18,715 | 219 | 48,415 | + 14,943 |
| Bradford | 76,831 | 22,521 | 36,739 | 44,044 | 180,135 | 109,200 | 3,279 | 20,965 | 31,144 | 2,894 | 30,783 | 4,693 | 90,479 | + 22,000 |
| Brighton | 14,309 | 4,028 | 12,853 | 8,316 | 39,506 | 14,292 | 27 | 7,800 | 5,560 | ... | 27 | ... | 13,360 | + 932 |
| Burnley | 18,718 | 5,306 | 9,525 | 15,881 | 49,430 | 30,460 | ... | 5,662 | 6,491 | 893 | ... | (f) 2,873 | 15,919 | + 14,541 |
| Burton-on-Trent | 5,111 | 1,322 | 2,903 | 2,998 | 12,334 | 3,353 | ... | 1,406 | 1,418 | ... | 1,500 | ... | 4,324 | − 971 |
| Bury | 14,761 | 4,349 | 6,633 | 8,026 | 33,769 | 33,885 | 337 | (k) 7,974 | 4,824 | 244 | ... | (w) 11,608 | 24,650 | + 9,572 |
| Chester | 3,278 | 1,598 | 828 | 2,248 | 7,952 | 4,868 | 95 | (h) 2,773 | 1,018 | .. | 1,172 | ... | 4,963 | ... |
| Chesterfield | 2,712 | 1,166 | 1,469 | 2,019 | 7,366 | 4,839 | 219 | 2,426 | 1,799 | ... | ... | ... | 4,225 | + 833 |
| Colchester | 2,825 | 1,189 | 1,771 | 2,508 | 8,293 | 2,465 | 48 | (h) 2,159 | 2,319 | ... | ... | ... | 4,478 | − 1,965 |
| Croydon | 29,571 | 6,806 | 13,300 | 16,541 | 66,218 | 26,246 | 907 | 7,994 | 7,428 | 1,145 | ... | ... | 16,567 | + 10,586 |
| Darlington | 4,192 | 762 | 1,912 | 1,945 | 8,811 | 3,365 | 102 | 2,010 | 1,966 | 105 | 404 | 59 | 4,544 | − 1,077 |
| Darwen | 3,448 | 754 | 2,627 | 2,232 | 9,061 | 5,710 | 111 | 2,314 | 2,186 | ... | 1,050 | ... | 5,550 | + 271 |
| Derby | E 16,132 H 558 | 2,434 ... | 4,428 55 | 9,026 ... | 32,020 613 | 15,343 def. 188 | 266 | 6,944 | 3,274 | ... | ... | (l) 208 | 10,426 | + 5,183 |
| Doncaster | 4,071 | 940 | 4,325 | 3,918 | 13,254 | 4,415 | 186 | 2,744 | 1,309 | ... | 107 | 441 | 4,601 | ... |
| Dundee | 16,160 | 4,963 | 7,262 | 10,999 | 39,384 | 23,296 | ... | 8,635 | 5,950 | 217 | 6,902 | 546 | 22,250 | + 1,046 |
| East Ham | 16,218 | 6,024 | 10,014 | 9,415 | 41,671 | 16,339 | ... | (h) 5,846 | 6,555 | ... | 517 | 85 | 15,003 | + 3,336 |
| Exeter | 4,511 | 1,175 | 1,311 | 3,499 | 10,496 | 6,252 | ... | (h) 2,347 | 1,814 | 48 | ... | ... | 4,209 | + 2,043 |
| Gloucester | 6,346 | 1,593 | 2,358 | 1,991 | 12,288 | 4,714 | ... | 4,813 | 2,218 | ... | ... | ... | 7,031 | − 2,317 |
| Halifax | 27,961 | 6,030 | 15,263 | 18,976 | 68,230 | 37,743 | ... | 10,108 | 10,562 | ... | 1,630 | 1,760 | 24,060 | + 13,683 |
| Ilford | 8,930 | 2,010 | 4,838 | 4,664 | 20,442 | 9,124 | 557 | 4,315 | 4,725 | ... | 641 | ... | 9,681 | ... |
| Ilkeston | 2,359 | 579 | 1,613 | 1,476 | 6,027 | 662 | 157 | 1,578 | 1,644 | .. | ... | 210 | 3,432 | − 2,613 |
| Ipswich | 8,072 | 1,827 | 4,015 | 3,502 | 17,416 | 5,988 | ... | (h) 3,642 | 2,078 | ... | ... | ... | 5,720 | + 268 |
| Keighley | 2,769 | 724 | 940 | 1,551 | 5,984 | 3,855 | 224 | 1,160 | 1,815 | ... | ... | (m) 1,104 | 4,079 | ... |
| Kilmarnock | 3,271 | 774 | 988 | 1,754 | 6,787 | 1,850 | 7 | (h) 1,637 | 1,238 | 2 | 1,160 | ... | 4,037 | − 2,180 |
| Kirkcaldy | 4,728 | 1,158 | 1,525 | 2,636 | 10,047 | 6,159 | ... | 2,660 | 1,608 | ... | 410 | 110 | 4,788 | + 1,370 |
| Lancaster | 2,237 | 474 | 872 | 1,621 | 5,204 | 376 | 80 | 1,243 | 1,467 | ... | ... | ... | 2,710 | − 2,254 |
| Leith | 9,057 | 2,439 | 3,588 | 3,147 | 18,231 | 16,462 | 86 | (h) 6,566 | 7,750 | ... | ... | 139 | 14,455 | + 2,093 |
| Leyton | (p) 16,573 | 5,056 | 8,211 | 11,672 | 41,512 | 21,156 | ... | 10,340 | 7,596 | ... | 1,478 | 264 | 19,678 | + 1,478 |
| Lincoln | 1,478 | 625 | 989 | 925 | 4,017 | 2,828 | 153 | 1,529 | 1,071 | ... | ... | ... | 2,600 | + 381 |
| Liverpool | 167,045 | 58,771 | 80,184 | 113,893 | 419,893 | 224,281 | 24,045 | 50,096 | 59,155 | ... | (d) 66,929 | e) 5,217 | 181,397 | + 66,929 |
| Lowestoft | 3,285 | 796 | 2,115 | 2,813 | 9,009 | 1,789 | .. | (h) 2,261 | 1,562 | ... | ... | 350 | 4,173 | − 2,384 |
| Maidstone | 2,324 | 1,077 | 1,139 | 1,868 | 6,408 | 3,369 | 58 | (h) 2,797 | 2,185 | ... | ... | 74 | 5,056 | − 1,609 |
| Manchester | 255,604 | 83,574 | 84,879 | 133,681 | 557,738 | 329,909 | 14,282 | 55,771 | 52,394 | 8,613 | 96,351 | (e) 31,062 | 244,191 | +100,000 |
| Nelson | 2,425 | 677 | 1,320 | 2,006 | 6,428 | 3,863 | ... | 1,008 | 966 | ... | ... | ... | 1,974 | + 1,889 |
| Newport (Mon.) | 9,900 | 3,230 | 5,882 | 7,516 | 26,528 | 10,654 | 904 | 6,145 | 4,074 | ... | ... | ... | 10,219 | + 1,339 |
| Nottingham | 43,601 | 15,142 | 18,684 | 30,847 | 108,274 | 58,886 | ... | 14,349 | 19,762 | ... | ... | ... | 34,111 | + 24,775 |
| Oldham | 25,086 | 6,931 | 17,077 | 22,090 | 71,184 | 30,915 | 1,369 | 15,448 | 11,501 | 1,636 | ... | (k) 6,112 | 34,697 | − 2,413 |
| Perth | 3,795 | 680 | 450 | 1,347 | 6,272 | 3,829 | 45 | 2,332 | 2,006 | 2 | 640 | 51 | 5,031 | − 1,187 |
| Plymouth | 7,933 | 3,542 | 5,029 | 7,577 | 24,081 | 13,832 | 1,258 | 4,778 | 3,931 | ... | 3,354 | ... | 12,063 | + 3,027 |
| Pontypridd | 5,307 | 1,469 | 6,611 | 3,656 | 17,043 | 6,123 | 5 | (h) 4,293 | 4,034 | ... | 590 | 41 | 8,958 | − 2,830 |
| Rawtenstall | 5,292 | 2,216 | 2,049 | 3,958 | 13,515 | 11,566 | (q) 1,663 | 6,148 | 5,531 | ... | ... | ... | 11,679 | + 1,550 |
| Rochdale | 16,421 | 4,475 | 6,944 | 9,527 | 37,367 | 35,635 | 246 | 11,380 | 9,594 | 694 | ... | (z) 7,727 | 29,395 | + 6,486 |
| Rotherham | 8,991 | 2,539 | 5,187 | 8,497 | 25,214 | 10,643 | 944 | 4,393 | 2,757 | ... | 3,707 | ... | 10,857 | + 750 |
| Salford | 67,947 | 16,384 | 24,721 | 47,166 | 156,218 | 97,814 | 5,158 | 19,550 | 23,846 | 2,295 | 9,569 | (k) 29,712 | 84,972 | + 18,000 |
| Southampton | 17,703 | 4,879 | 8,782 | 12,454 | 43,818 | 22,291 | 6,099 | 6,779 | 6,578 | 574 | ... | 488 | 14,419 | + 13,971 |
| Southend-on-Sea | 8,046 | 2,260 | 3,534 | 6,187 | 20,027 | 14,891 | 4,228 | (h) 3,834 | 1,753 | ... | 4,017 | ... | 9,605 | + 9,514 |
| Southport | 4,836 | 2,004 | 2,801 | 3,470 | 13,111 | 5,933 | 6,370 | 11,525 | ... | ... | 2,738 | ... | 14,263 | − 1,960 |
| South Shields | 7,929 | 3,263 | 2,659 | 5,370 | 19,221 | 14,931 | 313 | (h) 5,488 | 3,438 | ... | ... | ... | 8,926 | + 6,318 |
| Staly'dge, H., M., D. | 12,148 | 4,018 | 6,273 | 6,445 | 28,884 | 6,754 | ... | (h) 7,711 | 7,308 | ... | 327 | 532 | 15,878 | − 9,124 |
| Stockport | 12,436 | 3,717 | 6,437 | 4,781 | 27,371 | 33,468 | 1,326 | 5,978 | 8,363 | 910 | 6,795 | 3,208 | 25,254 | + 9,540 |
| Sunderland | 18,431 | 4,552 | 4,670 | 11,268 | 38,921 | 29,950 | 252 | (h) 7,228 | 10,366 | 476 | 7,132 | ... | 25,202 | + 5,000 |
| Wallasey | 16,074 | 4,027 | 5,281 | 12,979 | 38,361 | 19,746 | 474 | 6,270 | 4,383 | ... | 2,500 | 633 | 13,786 | + 6,434 |
| Walsall | 7,155 | 3,034 | 4,126 | 3,913 | 18,228 | 13,201 | 1,334 | 5,164 | 3,577 | 415 | 368 | 1,119 | 10,643 | + 3,892 |
| Walthamstow | 13,413 | 2,547 | 5,204 | 7,423 | 28,587 | 10,403 | 210 | (h) 6,214 | 2,599 | ... | ... | ... | 8,813 | + 1,800 |
| Warrington | 5,529 | 1,779 | 4,255 | 3,235 | 14,798 | 8,407 | 408 | 2,580 | 3,254 | ... | ... | ... | 5,834 | + 2,981 |
| West Ham | 51,254 | 11,253 | 26,921 | 19,386 | 108,814 | 29,628 | 508 | 19,511 | 12,369 | 685 | ... | 959 | 33,524 | — 3,388 |
| Wigan | ... | ... | ... | ... | 41,318 | 31,465 | ... | 13,859 | 12,391 | ... | ... | 3,781 | ... | ... |
| Wolverhampton | 12,259 | 4,157 | 7,334 | 6,778 | 30,528 | 24,232 | (x) 1,131 | 7,788 | 5,146 | 100 | 4,915 | (a) 3,637 | 21,586 | + 3,777 |
| Yarmouth (Gt.) | 7,443 | 1,867 | 2,634 | 4,388 | 16,332 | 7,801 | 95 | (h) 4,094 | 2,740 | ... | ... | ... | 6,834 | + 1,062 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | 73,836 | 13,642 | 32,519 | 23,887 | 143,884 | 110,492 | 1,363 | 45,900 | 24,541 | 2,023 | 13,000 | 1,628 | 87,092 | + 24,763 |
| Bexley | (s) 5,465 | 984 | 1,892 | 920 | 9,261 | 6,107 | ... | 2,942 | 2,325 | ... | 500 | ... | 5,767 | + 340 |
| Birkenhead | 16,099 | 4,011 | 10,380 | 9,371 | 39,861 | 25,706 | 86 | (h) 11,537 | 9,501 | 269 | 4,302 | 183 | 25,792 | ... |
| Bournemouth | 22,385 | 7,624 | 11,045 | 13,787 | 54,841 | 36,814 | 838 | 10,852 | 15,521 | ... | ... | (c) 7,900 | 34,273 | + 3,379 |
| Cardiff | 37,145 | (c) 10,512 | 14,894 | 17,223 | 79,774 | 65,150 | 1,529 | 24,327 | 23,079 | 750 | 6,947 | ... | 55,103 | + 11,576 |
| Glasgow | 305,400 | 122,812 | 142,988 | 48,147 | 619,347 | 392,197 | 58,631 | 81,774 | 97,077 | 13,388 | 215,757 | 9,829 | 417,825 | + 33,003 |
| Huddersfield | 26,892 | 6,064 | 22,638 | 9,933 | 65,527 | 44,182 | 61 | (h) 11,749 | 10,904 | 1,630 | ... | ... | 24,283 | + 19,960 |
| Hull | 47,495 | 12,212 | 42,005 | 11,245 | 112,957 | 45,484 | 1,500 | 16,730 | 12,201 | 1,500 | (u) 3,118 | ... | 33,549 | + 13,435 |
| Leeds | 109,413 | 36,055 | 39,894 | 28,455 | 213,817 | 197,714 | 7,511 | 42,197 | 49,923 | 5,021 | 41,752 | 4,957 | 143,850 | + 61,375 |
| Leicester | 47,876 | 9,497 | 22,023 | 15,633 | 96,029 | 52,642 | 2,512 | 23,252 | 12,095 | 1,939 | 7,668 | ... | 44,954 | + 10,000 |
| London | H 28,811 E 696,620 | 4,371 (r) 188,382 | 7,782 295,669 | (m) 32,694 167,639 | 73,658 1,348,310 | def. 11,966 946,179 | ... 29,440 | 334,173 | 369,356 | 22,858 | 138,152 | (l) 26,529 | 891,068 | + 84,551 |
| N'castle-on-Tyne | 60,663 | 17,730 | 29,951 | (g) 13,668 | 122,012 | 104,622 | 3,598 | 30,972 | 39,314 | 2,697 | 8,427 | (j) 13,368 | 94,778 | + 13,442 |
| Northampton | 7,254 | 3,080 | 2,489 | 3,563 | 16,386 | 11,763 | 279 | 2,481 | 4,312 | 323 | ... | (b) 1,226 | 9,342 | + 2,700 |
| Portsmouth | 28,392 | 9,780 | 9,225 | 4,482 | 51,879 | 60,723 | 2,677 | 20,798 | 17,458 | 1,109 | 8,694 | 1,273 | 49,332 | + 14,068 |
| Preston | 10,630 | 5,144 | 5,847 | 2,351 | 23,972 | 16,675 | ... | 4,324 | 4,749 | .. | ... | 1,361 | 10,434 | + 6,241 |
| Reading | 8,518 | 3,545 | 4,307 | 3,246 | 19,616 | 14,654 | ... | 6,626 | 4,662 | 162 | ... | ... | 11,450 | + 3,204 |
| Sheffield | 113,235 | 22,312 | 43,656 | 28,487 | 207,690 | 154,155 | 3,057 | 35,616 | 40,663 | 3,786 | 30,187 | 213 | 110,465 | + 46,748 |
| Wellington, N.Z. | 53,887 | 7,505 | 23,067 | 15,451 | 99,910 | 38,800 | 978 | 20,320 | 4,794 | ... | 17,489 | ... | 42,603 | — 2,825 |

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,570 insurance fund. (d) Includes reserve.
(e) Rents for leased lines. (f) £2,061 rent of leased lines. (g) Including street lighting. (h) Including income tax. (i) Accrued interest.
(j) Including £12,250 commuted payment to Newcastle Electric Supply Company. (k) Includes rents of lines. (l) Including loss on horse traction.
(m) Horsing expenses. (n) Transferred to motor omnibus capital account. (o) Including £9,612 for lighting generation. (p) Includes £243 horse account.
(q) Aid from rates £1,500. (r) Including special charges, £17,478. (s) Including £2,128 through-running expenses. (t) Car depot extensions.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £4,386 rent of leased lines. † This item includes £734 payable to Sinking Fund of Hurst U.D.C.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Appropriation of Net Surplus. | | | Receipts per Car Mile. | | Operating Expenses per Car Mile. | | | | | Percentage of Operating Expenses to Total Revenue. | Average Operating Expenses per Car Mile (excludi'g Power Cost). | Board of Trade Units. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carried Forward. | Reserve. | Contribution to Rates or Municip'l Funds. | Average Total per Car Mile. d. | Average Traffic per Car Mile. d. | Traffic. d. | General. d. | Repairs and Maintenance. d. | Power. (Price paid) d. | Total. d. | % | d. | Units. | Cost per Unit. d. | Units used per car mile. |
| Aberdeen ... | ... | 12,525 | ... | 11·06 | 10·92 | 2·859 | 1·298 | ·822 | ·985 | 5·964 | 53·89 | 4·979 | 2,110,964 | ·81 | 1·21 |
| Accrington ... | 460 | 3,359 | 724 | 12·57 | 12·38 | 3·09 | ·84 | ·95 | 2·10 | 6·98 | 55·55 | 4·88 | 907,721 | 1·24 | 1·70 |
| Ashton-u-Lyne | ... | ... | 1,350 | 11·475 | 11·186 | 2·463 | ·899 | 1·236 | 1·691 | 6·289 | 54·801 | 4·598 | 619,289 | 1·25 | 1·353 |
| Ayr... ... ... | .. | ... | 1,249 | 9·79 | 9·38 | 2·11 | 1·21 | ·86 | 1·19 | 5·39 | 55 | 4·19 | 374,296 | 1·24 | ·97 |
| Birmingham ... | ... | 45,000 | 56,352 | 10·62 | 10·492 | 2·929 | ·747 | 1·248 | 1·840 | 6·764 | 63·6 | 4·924 | 21,594,889 | 1·119 | 1·64 |
| Blackburn ... | 3,870 | ... | ... | 14·02 | 13·34 | 3·12 | ·90 | 2·61 | 2·31 | 8·94 | 56·84 | 6·63 | 2,030,535 | 1·3 | 1·81 |
| Blackpool ... | ... | ... | 5,000 | 16·63 | 16·37 | 3·65 | 1·21 | 3·28 | 2·10 | 10·24 | 61·57 | 8·14 | 1,238,641 | 1·60 | 1·31 |
| Bolton ... ... | 443 | ... | 14,500 | 11·558 | 11·447 | 2·525 | ·733 | 1·354 | 1·674 | 6·286 | 54·915 | 4·612 | 4,315,448 | 1·1 | 1·52 |
| Bradford ... ... | ... | ... | 22,000 | 12·211 | 11·600 | 3·398 | ·700 | 1·320 | 1·545 | 6·963 | 62·259 | 5·418 | 10,574,643 | 1 | 1·830 |
| Brighton ... .. | 932 | ... | ... | 11·545 | 11·112 | 3·071 | ·864 | 2·758 | 1·785 | 8·478 | 73·43 | 6·693 | 1,663,126 | 1·2 | 1·49 |
| Burnley ... ... | ... | 5,791 | 8,750 | 13·226 | 13·185 | 3·098 | ·878 | 1·577 | 2·630 | 8·183 | 61·85 | 5·55 | 3,079,155 | 1·214 | 2·11 |
| Burton-on-Trent | ... | ... | ... | 8·61 | 7·90 | 2·81 | ·73 | 1·45 | 1·42 | 6·41 | 78·7 | 4·99 | 515,622 | 1·39 | 1·01 |
| Bury ... ... | ... | (i) 4,572 | 5,000 | 10·22 | 10·04 | 2·214 | ·685 | 1·152 | 1·290 | 5·341 | 49·91 | 4·051 | 2,039,011 | 1·081 | 1·271 |
| Chester ... ... | ... | ... | ... | 8·84 | 8·51 | 2·26 | 1·10 | ·57 | 1·55 | 5·48 | 62 | 3·93 | 397,691 | ·764 | 1·14 |
| Chesterfield ... | ... | 833 | ... | 10·10 | 9·69 | 2·24 | ·96 | 1·22 | 1·68 | 6·1 | 59·6 | 4·43 | 387,704 | 1·25 | 1·3 |
| Colchester ... | ... | ... | ... | 7·98 | 7·627 | 2·096 | ·882 | 1·313 | 1·86 | 6·151 | 76·74 | 4·291 | 401,208 | 1·5 | 1·24 |
| Croydon ... ... | ... | 7,586 | 3,000 | 8·381 | 8·207 | 2·763 | ·637 | 1·224 | 1·499 | 6·123 | 70·91 | 4·497 | 2,484,993 | 1·604 | ·938 |
| Darlington ... | ... | ... | ... | 7·651 | 7·441 | 2·633 | ·480 | 1·202 | 1·222 | 5·537 | 72·36 | 4·315 | 466,784 | 1 | 1·222 |
| Darwen ... ... | 271 | ... | ... | 14·18 | 13·9 | 3·645 | ·708 | 2·224 | 2·507 | 9·084 | 61·3 | 6·55 | 421,503 | 1·313 | 1·68 |
| Derby ... ... | 5,183 | ... | ... | E 9·79<br>H. 5·70 | 9·50<br>5·47 | 3·33<br>7·49 | ·50<br>... | ·92<br>·74 | 1·87<br>... | 6·62<br>8·23 | 67·60<br>144·21 | 4·75<br>.. | 1,480,150<br>... | 1·50&1·45<br>... | 1·274<br>... |
| Doncaster ... | ... | ... | ... | 8·49 | 8·29 | 1·94 | ·44 | 2·06 | 1·86 | 6·30 | 75·1 | 4·44 | 683,855 | 1·375 | 1·35 |
| Dundee ... ... | ... | 46 | 1,000 | 11·263 | 10·980 | 2·904 | ·891 | 1·306 | 1·976 | 7·077 | 61·9 | 5·10 | 2,356,993 | 1·125 | 1·764 |
| East Ham .. | . | ... | ... | 10·39 | 10·26 | 2·90 | 1·08 | 1·79 | 1·69 | 7·46 | 71·8 | 5·77 | 1,995,635 | 1·125 | 1·49 |
| Exeter ... ... | ... | 2,043 | ... | 9·272 | 9·272 | 2·498 | ·650 | ·726 | 1·937 | 5·811 | 62·67 | 3·874 | 516,793 | 1·625 | 1·192 |
| Gloucester ... | ... | ... | ... | 6·694 | 6·258 | 2·498 | ·627 | ·929 | ·784 | 4·838 | 72 | 4·054 | 472,359 | 1 | ·77 |
| Halifax ... ... | 6,502 | ... | 7,181 | 11·816 | 11·702 | 3·117 | ·673 | 1·702 | 2·116 | 7·608 | 64 | 5·49 | 3,900,902 | 1·125 | 1·81 |
| Ilford ... ... | ... | ... | ... | 9·356 | 9·186 | 2·826 | ·636 | 1·531 | 1·476 | 6·469 | 69·2 | 4·993 | 994,999 | 1·125 | 1·31 |
| Ilkeston ... ... | ... | ... | ... | 6·73 | 6·57 | 2·36 | ·58 | 1·63 | 1·49 | 6·06 | 90·25 | 4·57 | 339,920 | 1·042 | 1·4 |
| Ipswich ... ... | 268 | ... | ... | 8·408 | 8·110 | 2·900 | ·657 | 1·442 | 1·258 | 6·257 | 74·41 | 4·999 | 672,411 | 1·25 | 1·007 |
| Keighley ... ... | ... | ... | ... | 9·721 | 9·473 | 2·736 | ·715 | ·929 | 1·532 | 5·912 | 61 | 4·380 | 248,096 | 1·5 | 1·021 |
| Kilmarnock ... | ... | ... | ... | 6·709 | 6·525 | 2·541 | ·601 | ·769 | 1·362 | 5·273 | 78·6 | 3·911 | 336,801 | 1·25 | 1·09 |
| Kirkcaldy ... | 1,370 | ... | ... | 8·22 | 7·97 | 2·398 | ·587 | ·774 | 1·337 | 5·096 | 63·95 | 3·75 | 632,581 | 1 | 1·337 |
| Lancaster ... | ... | ... | ... | 7·92 | 7·61 | 3·130 | ·664 | 1·221 | 2·269 | 7·284 | 91 | 5·015 | 228,902 | 1·7 | 1·33 |
| Leith ... ... | 2,093 | ... | ... | 8·72 | 8·51 | 2·28 | ·61 | ·91 | ·78 | 4·58 | 52·54 | 3·8 | 863,202 | ·875 | ·9 |
| Leyton ... ... | 1,478 | ... | ... | 10·365 | 10·142 | (c) 3·143 | ·964 | 1·417 | 1·711 | 7·235 | 66·241 | 5·524 | 2,542,672 | 1·078 | 1·587 |
| Lincoln ... ... | 381 | ... | ... | 10·24 | 10·05 | 2·21 | ·94 | 1·47 | 1·38 | 6·00 | 58·7 | 4·62 | 183,807 | 1·25 | 1·107 |
| Liverpool ... | ... | ... | 66,929 | 12·03 | 12·28 | 3·184 | 1·120 | 1·529 | 2·171 | 8·004 | 63·6 | 5·833 | ... | ... | ... |
| Lowestoft ... | ... | ... | ... | 8·3 | 8·3 | 2·5 | ·6 | 1·6 | 2·18 | 6·9 | 83·40 | 4·8 | 385,731 | 1·75 | 1·2 |
| Maidstone ... | ... | ... | ... | 8·19 | 7·77 | 1·942 | ·900 | ·952 | 1·55 | 5·344 | 69 | 3·79 | 358,616 | 1·25 | 1·25 |
| Manchester .. | ... | ... | 100,000 | 11·351 | 11·202 | 3·269 | 1·069 | 1·085 | 1·709 | 7·132 | 62·83 | 5·423 | 30,492,127 | 1·046 | 1·625 |
| Nelson ... .. | 1,889 | ... | ... | 12·29 | 12·23 | 2·89 | ·81 | 1·58 | 2·39 | 7·67 | 62 | 5·28 | 240,804 | 2 | 1·2 |
| Newport (Mon.)... | ... | (h) 1,339 | ... | 9·678 | 9·464 | 2·577 | ·840 | 1·532 | 1·956 | 6·905 | 71·40 | 4·949 | 1,389,504 | 1·25 | 1·51 |
| Nottingham ... | ... | 5,775 | 19,000 | 11·50 | 11·34 | 3·00 | 1·05 | 1·29 | 2·11 | 7·45 | 64·19 | 5·39 | 5,761,096 | 1·25 | 1·65 |
| Oldham ... .. | ... | ... | ... | 12·616 | 12·515 | 3·100 | ·857 | 2·110 | 2·729 | 8·796 | 69·72 | 6·067 | 3,541,360 | 1·375 | 1·823 |
| Perth ... ... | ... | ... | ... | 8·88 | 8·46 | 3·59 | ·64 | ·43 | 1·27 | 5·93 | 59 | 4·04 | 289,473 | 1·083 | 1·17 |
| Plymouth .. | ... | ... | 3,027 | 11·253 | 11·007 | 2·346 | 1·041 | 1·488 | 2·247 | 7·122 | 63·52 | 4·875 | 1,087,297 | 1·672 | 1·34 |
| Pontypridd ... | ... | ... | ... | 10·92 | 10·78 | 2·71 | ·75 | 3·37 | 1·87 | 8·70 | 80·65 | 6·83 | 701,941 | 1·25 | 1·49 |
| Rawtenstall ... | ... | 1,550 | ... | 11·16 | 10·71 | 2·35 | ·98 | ·92 | 1·76 | 6·01 | 53·54 | 4·25 | 687,821 | 1·381 | 1·27 |
| Rochdale ... .. | 6,486 | ... | ... | 11·020 | 10·966 | 2·479 | ·691 | 1·067 | 1·533 | 5·770 | 51·2 | 4·237 | 2,250,037 | 1·016 | 1·508 |
| Rotherham ... | ... | ... | 750 | 11·950 | 11·906 | 2·996 | ·846 | 1·729 | 2·832 | 8·403 | 70·32 | 5·571 | 1,359,602 | 1·5 | 1·88 |
| Salford ... ... | ... | ... | 18,000 | 10·497 | 10·494 | 2·807 | ·677 | 1·022 | 1·949 | 6·455 | 62 | 4·506 | 9,137,678 | 1·238 | 1·58 |
| Southampton ... | 8,971 | ... | 5,000 | 10·672 | 10·307 | 2·857 | ·788 | 1·418 | 2·010 | 7·073 | 66·3 | 5·063 | 1,874,217 | 1·625 | 1·266 |
| Southend-on-Sea | 2,514 | 1,000 | 6,000 | 13·14 | 12·97 | 3·03 | ·85 | 1·33 | 2·33 | 7·54 | 57·35 | 5·21 | 848,538 | 1·75 | 1·33 |
| Southport ... | ... | ... | ... | 9·827 | 9·611 | 2·495 | 1·034 | 1·446 | 1·791 | 6·766 | 70·3 | 4·9 | 545,793 | 1·50 | 1·172 |
| South Shields ... | (d) 500 | 4,218 | 1,600 | 10·066 | 9·919 | 2·253 | ·885 | ·729 | 1·566 | 5·433 | 56·28 | 4·077 | 914,188 | 1·407 | 1·122 |
| Stalybridge, &c. | ... | ... | ... | 7·880 | 7·729 | 2·686 | ·887 | 1·387 | 1·425 | 6·385 | 81·33 | 4·960 | 1,719,696 | ·9 | 1·584 |
| Stockport . | | 540 | 9,000 | 10·434 | 10·221 | 2·133 | ·638 | 1·103 | ·820 | 4·694 | 44·99 | 3·874 | 1,704,943 | 1·036 | 1·218 |
| Sunderland ... | ... | ... | 5,000 | 11·208 | 11·149 | 2·999 | ·741 | ·760 | 1·834 | 6·334 | 56·81 | 4·50 | 1,764,971 | 1·5 | 1·19 |
| Wallasey ... | 234 | (f) 200 | 6,000 | 11·357 | 11·207 | 3·142 | (g) ·787 | 1·032 | 2·563 | 7·497 | 65 | 4·96 | 1,916,450 | 1·625 | 1·56 |
| Walsall ... ... | 3,392 | ... | 500 | 11·326 | 11·038 | 2·578 | 1·094 | 1·487 | 1·410 | 6·569 | 58 | 5·159 | 780,825 | 1·25 | 1·172 |
| Walthamstow .. | 1,800 | ... | ... | 9·31 | 9·13 | 3·20 | ·61 | 1·24 | 1·77 | 6·82 | 73·32 | 5·05 | 1,188,326 | 1·5 | 1·18 |
| Warrington ... | 1,481 | ... | 1,500 | 12·398 | 12·237 | 2·954 | ·950 | 2·273 | 1·728 | 7·906 | 64·611 | 6·177 | 517,587 | 1·50 | 1·152 |
| West Ham ... | ... | ... | ... | 9·43 | 9·329 | 3·554 | ·761 | 1·823 | 1·313 | 7·451 | 78 | 6·038 | 6,103,884 | ·75 | 1·72 |
| Wigan ... ... | ... | ... | ... | 12·05 | 11·80 | ... | ... | ... | ... | 6·84 | 56·77 | 5·09 | 2,132,384 | ... | 1·471 |
| Wolverhampton | ... | ... | 3,777 | 11·250 | 11·086 | 2·518 | ·854 | 1·507 | 1·393 | 6·272 | 55·75 | 4·879 | 1,620,970 | 1 | 1·388 |
| Yarmouth (Gt.)... | 1,062 | ... | ... | 8·605 | 8·425 | 2·655 | ·666 | ·938 | 1·564 | 5·823 | 67·95 | 4·259 | 655,315 | 1·60 | ·974 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | * | | | | | Works Cost. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | 24,763 | ... | ... | 10·27 | 10·12 | 2·98 | ·55 | 1·31 | ·96 | 5·80 | 56·33 | 4·83 | 9,733,420 | ·589 | 1·40 |
| Bexley ... ... | 40 | .. | ... | 12·8 | 12·63 | 3·04 | ·89 | 1·75 | ·87 | 6·55 | 60·3 | 5·68 | 350,103 | ·63 | 1·37 |
| Birkenhead ... | ... | ... | ... | 12·075 | 11·89 | 3·128 | ·779 | 2·016 | 1·141 | 7·064 | 58·49 | 5·923 | 2,490,715 | ·565 | 2·016 |
| Bournemouth ... | ... | 3,379 | ... | 11·92 | 11·89 | 2·91 | ·99 | 1·44 | (b) 1·79 | 7·13 | 59·83 | 5·34 | 2,743,998 | ·576 | 1·48 |
| Cardiff ... ... | 6,926 | ... | 4,650 | 13·45 | 11·65 | 3·446 | ·976 | 1·382 | ·634 | 6·438 | 55 | 5·804 | 3,864,260 | ·415 | 1·49 |
| Glasgow ... ... | ... | ... | 33,003 | 10·404 | 10·364 | 3·141 | 1·263 | 1·471 | ·495 | 6·370 | 57·88 | 5·875 | 32,280,346 | ·358 | 1·38 |
| Huddersfield ... | ... | 13,370 | 6,590 | 11·04 | 10·73 | 2·70 | ·61 | 2·28 | 1·00 | 6·59 | 59·73 | 5·59 | 5,413,488 | ·42 | 2·27 |
| Hull ... ... | ... | 1,435 | 12,000 | 9·42 | 9·33 | 2·82 | ·68 | 2·46 | ·67 | 6·63 | 71·04 | 5·96 | 4,855,082 | ·67 | 1·31 |
| Leeds .. ... | ... | ... | 61,375 | 11·229 | 11·120 | 2·985 | ·984 | 1·089 | ·776 | 5·834 | 51·95 | 5·058 | 16,461,894 | ·440 | 1·807 |
| Leicester ... ... | ... | ... | 10,000 | 9·675 | 8·843 | 3·137 | ·622 | 1·443 | 1·024 | 6·226 | 64 | 5·202 | 6,558,800 | ·3645 | 1·79 |
| London ... .. | ... | H. 84,551 | ... | H. 8·81<br>E. 11·29 | 8·62<br>10·98 | 4·12<br>3·42 | ·62<br>·93 | 1·11<br>1·45 | 4·67<br>·83 | 10·52<br>6·63 | 119·40<br>58·76 | 10·52<br>5·80 | ...<br>122,307,298 | ...<br>·61 | ...<br>2·51 |
| N'castle-on-Tyne. | ... | ... | 13,442 | 11·841 | 11·317 | 3·170 | ·926 | 1·565 | (a) ·714 | 6·375 | 52·23 | 5·661 | 8,745,068 | ·356 | 1·904 |
| Northampton ... | 500 | 1,200 | 1,000 | 10·55 | 10·21 | 2·72 | 1·15 | ·93 | 1·34 | 6·14 | 58 | 4·80 | 934,909 | ·91 | 1·46 |
| Portsmouth ... | 8,068 | (f) 2,000 | 4,000 | 12·261 | 12·069 | 3·092 | 1·065 | 1·004 | ·488 | 5·649 | 46·08 | 5·161 | 2,583,580 | ·448 | 1·041 |
| Preston ... ... | ... | 6,241 | ... | 10·415 | 10·34 | 2·724 | 1·319 | 1·499 | ·602 | 6·144 | 59·22 | 5·542 | 1,377,176 | ·409 | 1·236 |
| Reading ... ... | ... | 1,344 | 1,860 | 8·968 | 8·676 | 2·229 | ·928 | 1·127 | ·849 | 5·133 | 57 | 4·28 | 955,400 | ·815 | ·90 |
| Sheffield ... ... | ... | 7,032 | 37,716 | 10·760 | 10·665 | 3·367 | ·664 | 1·298 | ·847 | 6·176 | 57·389 | 5·329 | 16,500,208 | ·673 | 1·837 |
| Wellington, N.Z. | ... | ... | ... | 14·615 | 14·666 | 5·698 | ·793 | 2·439 | 1·634 | 10·564 | 72·03 | 8·93 | 4,873,707 | ·765 | 2·14 |

H—Horse lines. E—Electric trolley system. * The figures given under "Power" in Table II. include actual works costs only. (a) Including power and street lighting. (b) Including ·93d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·05(d. (d) Accident, insurance, and compensation fund. (e) Total B.O.T. units, including lighting, 10,215,925. (f) Insurance fund. (g) Including ·09d. to Superannuation Fund. (h) Renewals Fund. (i) Including Insurance.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Population Served. | Car Mileage. | Passengers Carried. | Passengers Carried per Car Mile. | Average Fare per Passenger. | Average Journeys per Head of Populat'n per Annum. | Average Car Miles per Day per Car. | Traffic Revenue per Mile of Single Track. | Average Traffic Revenue per Annum per Head of Populat'n Served. | Operating Expenses per Passenger. | Average Distance of 1d. Fare. | Average Fare Charged per Mile. | Average Speed per Hour. | Average Total Car Hours per Day. | Average Number of Cars in Use Daily. | Number of Cars in Stock. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traffic Records. | | | | | | | | | | | | | | | |
| | | | | | d | | | £ | | d. | Miles. | d. | Miles. | | | |
| Aberdeen ... | 165.000 | 1,738,966 | 19,990,711 | 11·49 | ·95 | 121·15 | 105·8 | 2,930 | 9/6 | ·519 | 1·69 | ·6 | 7·5 | 655 | 45 | 77 |
| Accrington ... | 70.000 | 531,356 | 4,577,019 | 8·6 | 1·43 | 65·3 | 105 | 2,572 | 7/10 | ·81 | 1·07 | ·929 | 7·5 | 242 | 17 | 27 |
| Ashton-u-L. | 50.000 | 487,856 | 4,754,139 | 10·383 | 1·077 | 95·083 | 104 | 2,606 | 8/6 | ·606 | 1·223 | ·81 | 8 | 204 | 12 | 21 |
| Ayr ... ... | 33,000 | 385,796 | 3,739,237 | 9·69 | ·96 | 113 | 106 | 1,981 | 9/2 | ·556 | 1·25 | ·75 | 8 | 14 | 10 | 20 |
| Birmingham est. | 850,000 | 13,136,642 | 134,467,166 | 10·23 | 1·025 | 158 | 81·06 | 5,298 | 13/6 | ·66 | 2·34 | ·366 | 7·5 | 10·44 | 485 | 511 |
| Blackburn ... | 200,000 | 1,141,161 | 11,721,367 | 10·88 | 1·27 | 58·61 | 105 | 2,564 | 6/4 | ·87 | 1·25 | ·76 | 7·50 | 434 | 31 | 61 |
| Blackpool ... | 67,000 | 942,829 | 10,339,719 | 11 | 1·36 | 154·4 | 83 | 3,705 | 19/2 | ·934 | ... | ... | 8 | ... | 31 | 72 |
| Bolton ... | 221,000 | 2,831,003 | 30,287,673 | 10·69 | 1·065 | 137·04 | 121·66 | 2,875 | 12/3 | ·588 | 1·468 | ·627 | 7·25 | 1,030 | 60 | 106 |
| Bradford ... | 337,000 | 5,686,653 | 56,352,281 | 9·91 | 1·168 | 167 | 113·72 | 2,717 | 16/3 | ·767 | 1·60 | ·514 | 7·3 | 2,123·5 | 137 | 239 |
| Brighton ... | 132,265 | 1,118,309 | 11,312,855 | 10 | 1·09 | 85·55 | 82·83 | 3,012 | 7/11 | ·84 | 1·27 | ·788 | 6·41 | 544 | 34 | 50 |
| Burnley ... | 175,000 | 1,449,647 | 15,949,359 | 11 | 1·18 | 91 | 95 | 3,620 | 9/1 | ·744 | 1·25 | ·83 | 7 | 760 | 40 | 57 |
| Burton ... | 48,000 | 437,106 | 3,188,655 | 7·30 | 1·082 | 66 | ... | 1,684 | 5/10 | ·928 | 1·505 | ·58 | 7·5 | ... | ... | 20 |
| Bury ... ... | 128,202 | 1,599,872 | 15,132,553 | 9 | 1·07 | 118·03 | 102·33 | 1,957 | 10/6 | ·535 | 1·24 | ·85 | 8·56 | 506·64 | 42·71 | 54 |
| Chester ... | 39,038 | 347,904 | 3,078,564 | 8·85 | ·96 | 2·34 | 95 | 1,944 | 6/4 | ·622 | 1·27 | ·8 | 7 | 150·6 | 10·04 | 18 |
| Chesterfield | 38,000 | 289,890 | 2,519,533 | 8·69 | 1·1 | 66 | 132 | 2,249 | 6/5 | ·702 | 1·38 | ·75 | 7·33 | 117 | 6·5 | 14 |
| Colchester ... | 44,160 | 323,524 | 1,871,896 | 5·79 | 1·32 | 42·39 | 89·3 | 1,295 | 4/8 | 1·06 | ·85 | 1·09 | 6·81 | 157·92 | 9·87 | 18 |
| Croydon ... | 170,451 | 2,657,824 | 20,501,143 | 7·74 | 1·06 | 120·29 | 125 | 4,734 | 10/7 | ·775 | 2·15 | ·50 | 7·92 | 915·82 | 58 | 75 |
| Darlington ... | 58,000 | 381,920 | 3,791,835 | 9·9 | ·75 | 65·38 | 95·1 | 1,345 | 4/1 | ·557 | 1·219 | ·45 | 6·66 | 151·25 | 11 | 16 |
| Darwen ... | 40,611 | 249,950 | 2,785,037 | 11·1 | 1·17 | 68·5 | 40 | 2,029 | 7/2 | ·781 | 1·05 | ·78 | 8 | 115·56 | 6·42 | 17 |
| Derby ... | 124,544 | E 1,161,398 | 10,604,977 | 9·13 | 1·05 | 85·15 | ... | 2,103 | 7/5 | ·724 | 1·44 | ·75 | 6·375 | ... | ... | 50 |
| | | H. 17,876 | 98,364 | 5·44 | ·993 | | | ... | ... | 1·49 | 1 | 1 | .. | ... | ... | ... |
| Doncaster ... | 50,000 | 804,250 | 4,532,625 | 8·98 | ·922 | 90·65 | 115 | 1,479 | 7/- | ·702 | 1·25 | ·76 | 7·5 | 221 | 14 | 25 |
| Dundee ... | 165,000 | 1,335,512 | 17,022,560 | 12·74 | ·861 | 103 | 87 | 2,222 | 7/7 | ·555 | 2 | ·50 | 7·3 | 555 | 42 | 66 |
| East Ham ... | 133,000 | 1,340,252 | 17,789,734 | 13·27 | ·77 | 134 | ... | 3,981 | 8/7 | ·56 | 1·63 | ·65 | ... | ... | ... | 45 |
| Exeter ... | 48,660 | 433,507 | 4,110,513 | 9·48 | ·98 | 84·48 | ... | 2,392 | 6/11 | ·612 | 1 | 1 | 6 | ... | 16 | 20 |
| Gloucester ... | 52,795 | 609,531 | 4,111,175 | 6·7 | ·92 | 77 | 92·5 | 1,059 | 6/- | ·70 | 1·5 | ·65 | 7·11 | 243 | 18 | 30 |
| Halifax ... | 176,000 | 2,152,391 | 19,456,923 | 9·04 | 1·27 | 110 | 79·5 | 1,912 | 11/11 | ·841 | 1·35 | ·84 | 6·8 | 814 | 74 | 95 |
| Ilford ... | 80,000 | 758,456 | 7,784,992 | 11·21 | ·84 | 97·31 | 130 | 2,560 | 6/10 | ·630 | 1·543 | ·69 | 8 | ... | 16 | 26 |
| Ilkeston ... | 32,000 | 238,645 | 1,732,846 | 7·25 | ·9 | 54 | 117 | 1,713 | 6/1 | ·836 | 3·2 | ·35 | 7·5 | 108 | 7·5 | 13 |
| Ipswich ... | 75,300 | 668,025 | 5,554,585 | 8·31 | ·975 | 73·76 | 65·5 | 1,518 | 6/- | ·75 | 1·53 | ·693 | 6·17 | 234·19 | 20·78 | 36 |
| Keighley ... | 42,000 | 242,919 | 2,245,120 | 9·242 | ·98 | 53·45 | 55·42 | 1,568 | 4/7 | ·639 | 2·22 | ·45 | 6·87 | 126 | 7 | 12 |
| Kilmarnock ... | 36,000 | 308,976 | 2,268,033 | 7·34 | ·88 | 63 | 90·34 | 1,508 | 4/8 | ·728 | 1·13 | ·86 | 7·22 | 116·5 | 9·37 | 14 |
| Kirkcaldy ... | 39,600 | 473,089 | 5,237,947 | 11·07 | ·719 | 132·27 | 59 | 1,786 | 7/11 | ·46 | 1·522 | ·64 | 7·5 | 195 | 15 | 22 |
| Lancaster ... | 41,414 | 171,475 | 1,461,104 | 8·52 | ·893 | 35 | 75 | 1,132 | 2/8 | ·854 | 1·71 | ·5 | 8 | 88·2 | 6·3 | 12 |
| Leith ... | 81,000 | 954,563 | 9,339,324 | 9·7 | ·87 | 115·30 | 123 | 1,880 | 8/4 | ·46 | 1·32 | ·72 | 8·2 | 320 | 21·33 | 37 |
| Leyton ... | 124,736 | 1,601,833 | 16,897,512 | 10·549 | ·873 | 135 | 104 | 3,324 | 9/10 | ·590 | ... | ... | 7·70 | 574·56 | 42 | 60 |
| Lincoln ... | 20,000 | 160,446 | 1,733,259 | 10·8 | ·92 | 86·66 | 64·08 | 2,264 | 6/8 | ·556 | 1·75 | ·428 | 7 | 90 | 5 | 8 |
| Liverpool ... | ... | 12,590,408 | 134,249,967 | 10·66 | 1·128 | ... | ... | 5,303 | ... | ·756 | 2·45 | ... | ... | ... | 445 | 587 |
| Lowestoft ... | 35,000 | 308,897 | 2,462,188 | 8 | 1·05 | 70·35 | ... | 2,646 | 6/2 | ·878 | univ'rs'l penny fare | | .. | ... | .. | 19 |
| Maidstone ... | 25,000 | 287,179 | 2,096,488 | 7·3 | 1·062 | 83·85 | 70 | 1,319 | 7/5 | ·73 | 1 | 1 | 6·7 | 128 | 12 | 19 |
| Manchester | 950,000 | 18,768,259 | 187,675,183 | 10 | 1·12 | 198 | 95·8 | 4,990 | 17/5 | ·713 | 2·368 | ·422 | 7·25 | ... | 537 | 629 |
| Nelson ... | 45,000 | 200,996 | 2,776,785 | 13·82 | ·88 | 61·71 | 94·09 | 2,650 | 4/4 | ·555 | 1 | 1 | 5·50 | 108 | 6 | 11 |
| Newport ... | 85,634 | 922,064 | 8,937,257 | 9·69 | ·998 | 104·4 | 109 | 2,518 | 8/6 | ·488 | 1/4 68 | ·66 | 6·77 | 18½ | 27 | 44 |
| Nottingham | 260,000 | 3,485,789 | 38,484,032 | 11·04 | 1·02 | 148 | 92·08 | 4,514 | 12/8 | ·67 | 1·68 | ·65 | 6·86 | ... | 104 | 135 |
| Oldham ... | 180,000 | 1,942,147 | 20,073,483 | 10·335 | 1·19 | 111·51 | 106·5 | 2,796 | 11/3 | ·851 | 1·12 | ·884 | 6·56 | 800 | 50 | 92 |
| Perth ... | 35,900 | 253,851 | 1,861,145 | 7·33 | 1·15 | 51·84 | 96·25 | 1,892 | 5/5 | ·72 | .. | ... | 6·25 | 120 | 8 | 12 |
| Plymouth ... | 112,000 | 809,036 | 8,666,269 | 10·71 | 1·026 | 77·377 | 93·5 | ... | 6/8 | ·667 | ... | ... | ... | 25·5 | ... | 42 |
| Pontypridd ... | 40,000 | 470,215 | 4,721,110 | 10·04 | 1·07 | 118 | 83·4 | 2,457 | 10/7 | ·77 | 1·25 | ·51 | 6·5 | 234 | 18 | 26 |
| Rawtenstall ... | 30,516 | 539,320 | 4,669,522 | 8·66 | 1·24 | 93·39 | 123 | 1,515 | 15/9 | ·69 | 1·12 | ·88 | 9 | 16½ | 12 | 22 |
| Rochdale ... | 130,000 | 1,589,866 | 12,711,114 | 7·99 | 1·35 | 97·7 | 114·90 | 1,825 | 11/2 | ·76 | 1·07 | ·90 | 7·66 | 645 | 43 | 69 |
| Rotherham ... | 64,000 | 720,133 | 7,813,922 | 10·85 | 1·097 | 122·1 | 116 | 2,977 | 11/2 | ·774 | 1·5 | 1 | 12 | 19 | 20 | 36 |
| Salford ... | 350,000 | 5,808,369 | 48,720,788 | 8·38 | 1·30 | 139 | 114 | 3,386 | 14/6 | ·76 | 1·85 | ·55 | 7·96 | 2,135 | 140 | 200 |
| Southampt'n | 122,200 | 1,486,746 | 12,348,658 | 8·306 | 1·241 | 101 | ... | 3,592 | 10/5 | ·85 | ... | ... | ... | ... | ... | 68 |
| Southend ... | 78,000 | 637,366 | 7,581,104 | 11·89 | 1·09 | 97·2 | 87 | 4,708 | 8/10 | ·634 | 1·41 | ·76 | 6·5 | 17 | 21 | 31 |
| Southport ... | 31,312 | 465,100 | 4,745,450 | 10·203 | ·945 | 151·55 | 103·7 | 1,734 | 11/11 | ·663 | 1·6 | ·620 | 6·65 | 210 | 14 | 26 |
| So'th Shields | 110,513 | 814,212 | 8,456,688 | 10·386 | ·942 | 76·5 | 129·2 | 3,332 | 6/1 | ·545 | 1·825 | ·54 | 7·61 | 282 | 16 | 35 |
| Stalybridge | 92,933 | 1,085,545 | 8,896,836 | 8·123 | ·943 | 95·7 | ... | 1,280 | 7/6 | ·779 | 1·275 | ·784 | 6·8 | ... | ... | 60 |
| Stockport ... | 120,000 | 1,399,314 | 10,665,098 | 7·6 | 1·341 | 88·8 | 76·6 | 2,158 | 9/11·3 | ·615 | 1·25 | ·72 | 7·5 | 465 | 38 | 50 |
| Sunderland ... | 170,000 | 1,474,637 | 16,972,537 | 11·5 | ·968 | 99·8 | 79·3 | 3,366 | 8/1 | ·550 | 1·34 | ·68 | 7 | 672 | 42 | 70 |
| Wallasey ... | 81,000 | 1,227,935 | 11,459,807 | 9·33 | 1·20 | 141·48 | 98·6 | 2,887 | 14·2 | ·803 | 1·99 | ·52 | 7 | 580 | 42 | 55 |
| Walsall ... | 100,000 | 665,964 | 5,643,798 | 8·535 | 1·293 | 87 | 57 | 1,750 | 6/1 | ·769 | 1·24 | ·77 | 7 | 315 | 21 | 39 |
| Walth'mst'w | 126,000 | 1,004,872 | 12,049,323 | 11·99 | ·762 | 95·63 | 97 | 3,052 | 6/1 | ·569 | 1·15 | ·89 | 7·2 | 408 | 36 | 58 |
| Warrington | 86,000 | 449,206 | 6,064,139 | 13·5 | ·906 | 70·513 | 102·533 | 2,372 | 5/4 | ·584 | 1·246 | ·803 | 6·408 | 192·048 | 12·003 | 21 |
| West Ham ... | 294,200 | 3,544,292 | 40,200,347 | 11·34 | ·822 | 136 | 98 | 4,592 | 9/4 | ·65 | 1·80 | ·56 | 7·66 | 1,262·25 | 99 | 118 |
| Wigan ... | 200,000 | 1,449,188 | 13,018,833 | 8·98 | 1·314 | 65·1 | 105·5 | 2,309 | 7/2 | ·761 | 1·15 | ... | 7·4 | ... | 42 | 67 |
| Wolverh'ton | 135,000 | 1,168,239 | 11,913,122 | 10·198 | 1·08 | 88·25 | 87 | 2,510 | 8/- | ·615 | 1·18 | ·879 | 6·85 | 622·2 | 36·6 | 49 |
| Yarmouth ... | 55,800 | 673,027 | 4,514,871 | 6·7 | 1·256 | 80·91 | 73·7 | 1,687 | 8/6 | ·868 | 1·25 | ·76 | 7 | 375 | 25 | 35 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... | 385,492 | 5,946,659 | 58,437,942 | 9·82 | 1·07 | 151 | 128 | 2,539 | 13/- | ·592 | 1·96 | ·43 | 8·75 | 2,256 | 141 | 282 |
| Bexley ... | 16,000 | 262,658 | 2,130,189 | 8·11 | 1·56 | 133 | ... | 2,360 | 18/11 | ·95 | 1·37 | ·62 | 7·5 | ... | 8 | 16 |
| Birkenhead | 130,832 | 1,235,277 | 13,622,361 | 11·02 | 1·077 | 104·12 | 68·64 | 2,540 | 9/4 | ·702 | 1·39 | ·66 | 6·61 | 511·73 | 49·30 | 59 |
| Bournem'uth | 120,000 | 1,844,507 | 15,121,935 | 8·09 | 1·45 | 126 | 84·23 | 3,069 | 15/3 | ·87 | 1·19 | ·87 | 6·80 | 820 | 60 | 81 |
| Cardiff ... | 182,729 | 2,586,421 | 27,561,652 | 10·66 | 1·09 | 151 | 98·5 | 3,947 | 13/9 | ·69 | 1·44 | ·736 | 7·5 | 1,104 | 69 | 130 |
| Glasgow ... | 1,150,000 | 23,335,008 | 311,480,086 | 13·348 | ·776 | 270·85 | 105·49 | 5,139 | 17/6 | ·477 | 2·31 | ·44 | 8·13 | 8,484·59 | 606·04 | 843 |
| Huddersfield | 160,000 | (a) 2,383,858 | 21,595,569 | 9·09 | 1·18 | 144 | 120 | 3,675 | 13/4 | ·728 | 1·39 | ·70 | 7·48 | 868·32 | 54·27 | 86 |
| Hull ... ... | 287,032 | 4,040,739 | 42,997,226 | 10·64 | ·877 | 149·80 | 127·10 | 5,141 | 10/7 | ·631 | 2·75 | ... | 9 | 1,393·6 | 87·10 | 160 |
| Leeds ... | 500,000 | 8,795,465 | 89,668,185 | 10·2 | 1·088 | 179 | 113·35 | 3,594 | 16/3 | (b) ·937 | 1·95 | ·539 | 7·48 | 3,190 | 213 | 232 |
| Leicester ... | 229,296 | 3,663,215 | 32,907,795 | 8·983 | ·981 | 143 | 95 | 3,648 | 11/9 | ·693 | 2·18 | ·984 | 8 | 18 | 107 | 140 |
| London ... | ... | H 1,680,786 | 17,347,746 | 10·32 | ·84 | ... | 83 | 2,646 | ... | 1·019 | ... | ... | 6·15 | 742·5 | 55 | 96 |
| | | E 48,777,026 | 516,092,489 | 10·58 | 1·04 | ... | 113 | 8,732 | ... | ·627 | ... | ... | 8·44 | 15,786·8 | 1,179 | 1,584 |
| Newcastle ... | 300,000 | 4,593,419 | 49,348,688 | 10·74 | 1·087 | 164 | ... | 3,595 | 14·5 | ·59 | 1·58 | ·633 | 7 | ... | ... | 186 |
| Northampt'n | 90,793 | 640,158 | 6,727,190 | 10·51 | ·97 | 76·53 | .. | 2,974 | 6 | ·58 | 1·34 | ·7 | 6·91 | ... | ... | 26 |
| Portsmouth | 236,732 | 2,204,042 | 25,039,320 | 11·36 | 1·066 | 110 | 84 | 3,593 | 9/5 | ·497 | 1·66 | ·62 | 7 | 1,086 | 72 | 100 |
| Preston ... | 120,000 | 936,553 | 9,000,070 | 9·61 | 1·02 | 75 | 130 | 3,802 | 6/9 | ·639 | 1·01 | ·95 | 7·36 | 380 | 20 | 30 |
| Reading ... | 75,500 | 917,045 | 8,279,650 | 9·02 | ·97 | 109 | 97 | 2,505 | 8/9 | ·57 | 1·59 | ·68 | 7 | 352 | 26 | 36 |
| Sheffield ... | 466,408 | 8,071,188 | 96,330,242 | 11·935 | ·893 | 206·535 | 103·32 | 4,606 | 15/5 | ·517 | 2·62 | ·386 | 7·372 | 3,103·27 | 214·019 | 279 |
| Wellington ... | 68,000 | 2,269,840 | 23,262,433 | 11·01 | 1·33 | 342 | 93 | 4,316 | 42/8 | ·94 | 1·287 | ·76 | 8·01 | 786 | 68 | 85 |

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.
(c) Includes tramway operating cost only, excludes cost bulk supply to lighting department.

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4·9 per cent. of the total capital outlay. The profits from the tramways had during the past 12 years provided for interest and sinking fund charges a total of approximately £234,460, being £117,842 towards the reduction of the debt incurred on the tramways, and £116,618 towards interest on capital.

**General Electric Company.**—Presiding at the annnal meeting of the General Electric Company in London on July 10, Mr. H. Hirst said that the net trading profits and income from investments for the past year amounted to £145,260, against £133,567 for 1911-12, to which must be added the balance brought forward, which gave them a total of £177,311 to be dealt with, against £145,777. They proposed to pay this year 10 per cent. on their ordinary shares, against 7½ per cent. last year. Certain of their manufacturing departments, producing specialities, had been turned, for purposes of policy, into separate companies, so that they could take as partners experts in specific lines. Their investments under that heading amounted to about £100,000. There was an ever increasing demand for electrical power for use in small and big industries; they were on the threshold of a big development in electrical heating and cooking, and the electrification of railways was coming fast.

**Lanarkshire Tramways Company.**—The traffic receipts for the half-year to June 30 last show an increase of £6,314, and the expenses an increase of £3,182, as compared with the corresponding half-year of 1912. Including £1,577 brought forward, the disposable balance is £17,383, out of which it is proposed to declare a dividend on the issued share capital at the rate of 6 per cent. per annum for the half-year, carrying £7,093 to revenue new account. For the first half of 1912 the dividend was 5½ per cent. per annum. A service of motor-'buses was inaugurated during the half-year, and commenced running in April between Newarthill and Cleekhimin, but the result so far, from the company's point of view, has not been satisfactory. The Lanark County Council are proceeding with the construction of tramways from Uddingston to Bellshill, Mossend, and New Stevenston. It is anticipated that part of the tramways will be in operation by the end of August and the remainder by the end of October. These tramways will be leased to the company.

**Cardiff Tramways Report.**—The Tramways Committee regarded as very satisfactory the report on the working of the tramways for the year ended March 31 last, presented to them on July 11. The total income was £150,626, £5,702 in excess of last year. Of the £20,326 surplus of income over expenditure (an increase of £1,803), £6,946 had been contributed to the depreciation account, £9,400 for the relief of rates, equal to 2d. in the pound, leaving £3,979 in hand. During the past two years £18,700 had been transferred to the relief of the rates, which more than wiped out the amount taken from the rates during the year ending March, 1992, while the work of reconstruction was proceeding, amounting to £8,824. These results had been achieved despite the unsatisfactory summer last year, the industrial disputes—over £2,000 more was spent on coal owing to the increased price—and the increases in wages granted to the employees amounting to a substantial sum. The number of passengers was 28,305,277, an increase of 803,625, and the car-mileage had increased by 28,480 from 2,586,421 to 2,614,901.

**Coventry Corporation Tramways.**—The statement of accounts issued by the tramways department of Coventry Corporation covers a period of 15 months ending March 31, 1913, the full period since the Corporation acquired the tramways from the company. The report for the past 12 months shows that there was a total expenditure of £24,118 (or 5·822d. per car-mile), and the gross profit was £15,035 (or 3·629d. per car-mile). The total earnings were £39,153 (or 9·451d. per car-mile). The percentage of working expenses to receipts was 61·6. The gross profit for the three months ended March 31, 1912, amounted to £2,949, making a total gross profit for the 15 months of £17,984. This amount has been appropriated as follows: Interest, £10,379; sinking fund (eight months), £3,286; reserve in lieu of sinking fund for seven months, £2,875; balance, £1,443. The total capital expenditure stands at £211,298, and the Corporation have 15¼ miles of track and 40 cars. During 12 months the energy consumption for all purposes amounted to 1,533,212 units, the cost per unit being ·450d. The consumption per car-mile was 1·44 units. The total number of car-miles for the year was 994,207, and the car hours 154,919. The passengers amounted to 7,639,065. The population served is 135,000, and the average journeys per head averaged 57.

**Stalybridge Joint Tramways Loss: Heavy Motors and Track Repair.**—The Stalybridge, Hyde, Mossley, and Dukinfield Joint Tramways and Electricity Board have received a report that the loss on the year's working was £9,124, or £2,000 more than in the preceding year. Alderman Wood (Stalybridge), in moving adoption of Tramways Committee minutes, said that in 1906 they earned 6·04d. per mile, and last year 7·88d. On track and overhead equipment they spent £2,000. That sum included not only upkeep of the rails, but the pavement also. At the Tramways and Light Railways Association meeting a resolution was passed asking Parliament to do something in the way of asking the owners of commercial motors who carried heavy loads to pay something for the upkeep of the roads.—Mossley Council at their July meeting agreed to pay the sum of £2,281 as their share of the loss. Alderman Clark, chairman of the Tramway Committee of the Board, said the loss was due to unforeseen circumstances. Referring to complaints as to the cars causing passengers to miss trains, he observed that on a small system, and with single lines, they could not run cars as regularly as on one with double lines. After the last accident the shed at Mossley was closed on the recommendation of the Government inspector. It was better for the cars all to be at one shed, where they could be properly inspected before turning out. The Mayor said the bad year was chiefly caused by the tramwaymen's strike, the coal strike, the cost of coal, and the breakdown of plant. Their great difficulty was that they were only earning 8d. per mile when it should be 10d. The electricity department was doing fairly well, and would, he hoped, be able to give a helping hand next year.

**A Record Year at Aberdeen.**—Mr. R. S. Pilcher's report for the year ended May 31 last states that in the previous year the profit amounted to £11,158, but in the year under review the amount was £12,524, the largest profit yet obtained. The whole of this sum is available for the reserve fund, as sufficient is now being laid aside each year to meet future requirements for the renewal of the track; and this is the free surplus revenue that would be available if the Council receives from Parliament the power which they have resolved to ask —in any year to appropriate and apply a sum not exceeding one-third of the free surplus revenue of the tramway undertaking for that year to the Common Good of the city, or towards the reduction of the city rates, or in carrying out city improvements, as the Corporation may in their discretion determine. The reserve account of the undertaking amounts to £16,518; a sum of £126,949 stands at the credit of the depreciation and renewal account; while the sinking fund amounts to £41,905. The total revenue amounted to £80,166, an increase of £2,985, and the highest figure yet obtained. This is very satisfactory considering the wet summer of 1912. Working expenses came to £43,206, an increase of £2,236. This increase is mainly owing to the fact that 95,719 additional miles were run during the year. Interest, sinking fund, depreciation, and renewals absorbed £24,906, a decrease of £510 The increase in surplus or profit for the year amounted to £1,366. Six new cars were put into service, making a total of 77, of which 58 have top covers. The department will, however, require more cars to adequately deal with the growing traffic. Wind screens for the protection of motormen were erected on 50 top-covered cars during the year; the remaining cars will be fitted during the next year. These screens have been much appreciated by the motormen, amongst whom there seems to be much less illness since the screens were fitted. The manager's reference to the success of the P-A-Y-E cars is given elsewhere.

**Croydon Corporation Tramways.**—The report of the general manager, Mr. T. B. Goodyer, to the Tramways Committee, shows that the total receipts for the year ended March 31 amounted to £92,463, and the working expenses to £66,218. Including bank interest there is a gross balance of £27,153, a decrease as compared with the previons year of £6,434. After providing for interest on capital, £7,993; contribution to sinking fund, £7,428; and income tax, £1,145; there is a net balance of £10,586 (a decrease of £6,717). Of this sum £3,000 has been paid in aid of rates, and £7,586 has been transferred to the renewals fund. The gross balance is equal to 9 53 per cent. on the capital outlay, and the net balance to 3·72 per cent. The percentage of expenses to total revenue is 70·91. Unfavourable weather and motor omnibus competition, increased rates, increased power costs, due to the additional mileage, increased cost of permanent way repairs, etc., are mentioned in explanation of the decrease in the net results. The total receipts per car-mile were 8·46d., a decrease of ·85d. as compared with the previous year. The average profit per passenger has decreased from ·168d. in 1912 to ·087d. in 1913. The consumption of electrical energy was 2,484,993 units, an average of ·938 unit per car-mile, the cost being 1·505d. per car-mile (a reduction of ·049d.), while the average cost per unit is 1·604d. Mr. Goodyer's remarks on motor omnibus competition are given elsewhere in this issue. Councillor Denning, in moving the adoption of the report, said he wished to draw attention to a few other items. They paid in rates £2,500, and to the Roads Committee, for the maintenance of roads which the Tramways Committee did not touch, £5,370. To the Electricity Committee they paid £16,813, a large part of which must have been profit to that committee. Croydon had benefited from the tramway undertaking to the extent of £40,000. They had at the same time given a nineteen-and-a-half-hours-a-day service of cars, they had carried people for a halfpenny a mile, run workmen's cars at a charge considerably less than a halfpenny a mile. In addition, they had provided a two to five-minute service all over the system. They had, moreover, run the cars very quickly, and thus satisfied those who had used them. Councillor Denning added that he wished to endorse the paragraph of appreciation Mr. Goodyer had written with regard to the staff. People were struck with the civility and attention received from the conductors.



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## MR. J. S. D. MOFFET.

Mr. J. S. D. Moffet, who has been appointed general manager of West Ham Corporation Tramways, was educated at the Hall School, Sunderland, the Heriot Watt Engineering College, Edinburgh, and the Durham College of Science, Durham University, Newcastle-on-Tyne. From 1890 to 1899 he served an apprenticeship in the engineering workshops of Messrs. George Clarke, Limited, Southwick, Sunderland. He was trained for the civil engineering profession under Mr. R. S. Rounthwaite, borough engineer of Sunderland, and for the last two years of that period was engaged as an engineering assistant. In 1899 he secured an appointment on the staff of Mr. S. S. Platt, borough engineer of Rochdale, and acted as chief engineering and tramways assistant up to 1904, during which time he was engaged in the promotion and construction of a big tramway and improvement scheme for that borough, involving an expenditure of £400,000.

Mr. J. S. D. Moffet.

In 1904 he was appointed general manager of the Rochdale system, and as the responsible engineer has carried out several large extensions for the Corporation. He has also acted in a consultant capacity for a number of other authorities in the promotion and construction of tramway and light railway schemes, and as an expert on tramway matters has given evidence before Parliamentary Committees, the Light Railway Commissioners, and in the Chancery Court.

As general manager he was responsible for the organisation and development of practically the whole of the Rochdale system from its inception, including the traffic, overhead equipment, permanent way, and administrative departments. During his period of office, the revenue of the undertaking increased from £15,000 to £80,000 per annum.

## THE BRISTOL TRAMWAYS AND THE CORPORATION.

Under section 43 of the Tramways Act of 1870, the Bristol Corporation have the option of purchasing the greater part of the tramways in the city, amounting to 25 miles out of a total length of 31 miles, on May 1, 1915. The Corporation, who are now considering the question of purchase, have found it necessary to obtain not only an estimate of the approximate value of the tramways but also of the probable results from the future working of the tramways either by municipal or private ownership. For this purpose the Corporation retained the services of Mr. J. B. Hamilton, general manager of Leeds Corporation Tramways, and Mr. J. F. C. Snell, consulting engineer of the firm of Messrs. Preece, Cardew, and Snell, and we understand that these gentlemen are at present completing a valuation of the tramways and preparing a report. When this has been received the Corporation will be in a position to decide whether they should go forward with a bill in the next session of Parliament to secure powers to work the tramways. Whether they should exercise such powers, if obtained, or allow the company to continue to work the undertaking would, of course, not require to be determined immediately.

## PERSONAL.

**Mr. I. Bulfin,** general manager of Bournemouth Corporation Tramways, has been granted an advance in his salary to £700.

**Mr. J. R. Taylor,** chief clerk in the Ashton tramways department, has been recommended for an increase of £13 per annum in his salary.

**Mr. H. H. Couzens,** late of Hampstead Electricity Works, took over the charge of the new hydro-electric installation at Toronto on July 1.

**Mr. W. M. Nelson** has resigned his appointment as engineer to the Christchurch (N.Z.) Tramways, and rejoined the Brisbane Tramways Company.

**Mr. R. H. Schofield,** who has been appointed sales manager to Ferranti, Limited, Central House, Kingsway, W.C., has been with the Ferranti Company nearly 20 years.

**Lieut.-Colonel F. G. Von Donop,** R.E., has been appointed Chief Inspecting Officer of Railways, in succession to Colonel Sir Arthur Yorke, R.E., C.B., who has retired under the age limit.

**Mr. L. C. F. Bellamy,** manager of Ilkeston Corporation Tramways and borough electrical engineer, was married on July 23 to Miss Eileen Leghorn at St. John's Church, Fairfield, Liverpool.

**Captain T. C. FitzHugh,** M.V.O., the Chief Commissioner in the Far East, recently appointed by the British Engineers' Association, has left London for Peking accompanied by his technical secretary, Mr. L. B. Stevens.

**Mr. A. Murdock,** electrical and tramways engineer to the Melbourne City Tramways, who recently returned to England on leave, has been staying at Blackpool, where he was formerly on the staff of the Corporation electricity works.

**Inspector J. Pearson,** of Glasgow Corporation Tramways, has been presented with the St. Andrew's Ambulance Association certificate of honour for bravery in stopping a runaway horse. But for his action some of the passers-by must have been injured.

**Mr. H. King,** late traffic superintendent of the Merthyr Electric Traction Company, has been presented with a testimonial recording the esteem in which he is held by the staff and employees Mr. King has been appointed tramways manager at Aberdare.

**Sir J. S. Harmood Banner,** M.P., Lord Mayor of Liverpool, who was knighted on the occasion of the King's visit, is a director of the British Insulated and Helsby Cables, Limited, the Midland Electric Corporation for Power Distribution, Limited, etc.

**Mr. Francis Husband** has resigned his position with the London County Council Tramways to take up the position of engineer and director with the Electrical Contracts and Maintenance Company, Limited, Sanctuary House, Westminster, S.W., as from July 1.

**Aberdare Tramways Appointments.**—The following members of the electricity staff have been appointed to positions in the electricity and tramways department: Mr. W. J. Williams, as works superintendent; Mr. W. T. Hilder, as outside superintendent; and Mr. G. D. Morgan as chief clerk.

**Mr. G. Webster,** who has been the Rochdale Corporation Tramways traffic superintendent for the last 10 years, has been recommended by the Tramways Committee for appointment as general manager, in succession to Mr. J. S. D. Moffet, now manager of the West Ham Tramways.

**Mr. Arthur Ellis,** the general manager and electrical engineer, and the staff of Cardiff tramways, were heartily praised for their work during the past year by Sir John Courtis, the chairman of the Tramways Committee, when proposing the adoption of the annual report on the working of the tramways.

**Mr. F. Buckley,** general manager of Wigan Corporation Tramways, was referred to in terms of praise by the employees at their annual outing, for his efforts to bring about a satisfactory solution of the question of improved conditions of employment. A resolution was passed thanking the Tramways Committee for their favourable response to the men's application.

**Mr. R. Cook,** for 11 years a conductor, motorman, and inspector on the Doncaster tramways, has been presented with a marble clock and bronzes by the electricity and tramways staff on his retirement to take up an appointment as wagon inspector at Bentley Colliery. Mr. G. A. Roberts, assistant engineer, made the presentation in the absence of the electrical engineer.

**Mr. J. Dalrymple,** general manager, Glasgow Corporation Tramways, sailed for New York on August 9 to visit the most important cities in America where tramways are in operation. Mr. Dalrymple is no stranger in America, for in 1904 he was specially retained by Chicago City Council to report on a proposed scheme for municipalisation In view of the proposal to construct a new bridge over the Clyde, the master of works of Glasgow is to visit places in America where different types of opening bridges may be seen.

**Mr. J. Barnard** has been unanimously appointed general manager of the Bolton tramways at a salary of £400, rising to a maximum of £600. Mr. Barnard was previously traffic manager. The vacant

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position of engineer and manager of the electricity department has been filled by the appointment of Mr. W. J. H. Wood at a salary of £400, rising by annual increments of £50 to £600. Mr. Wood had previously held the position of station engineer.

**Mr. Butler** has been appointed engineer of tracks and tramways to the Government of Tasmania. At an inquiry held at Launceston on May 21 by the Minister of Lands and Works into applications for tramway improvements, the Minister said there had been some difficulty with the Public Service Board in creating the new office. The department's trouble was that they had more work than they had engineers for. It would take the engineer some time to organise his department.

**Mr. Alfred Clough,** resident electrical engineer to the Liverpool Tramways and Electric Power and Lighting Committee, acting under medical advice, has intimated his desire to retire from the service. The resignation has been accepted as and from October 1 next, and the commtttee have placed on record their appreciation of the services rendered by Mr. Clough to the Corporation and to the community in connection with the management and development of the electric supply undertaking.

**Mr. E. Goolding,** who has been for the past seven years in the electrical department of the London County Council Tramways, has rejoined the British Thomson-Houston Company, and sailed on July 24 for the Argentine in connection with railway electrification work. Mr. E. Goolding was with the British Thomson-Houston Company during the North Eastern Railway Company's electrification scheme, and previous to that he was in the electrical department of the Great Northern Railway Company.

**Aldermen J. Clark, J.P., and R. Wood,** the chairmen of the Tramways and Electricity Committees of the Stalybridge and District Joint Tramways Board, were referred to in terms of commendation at a meeting of the Mossley Council, Councillor Sykes remarking that the members of the Joint Board were proud of the two chairmen. Expressing a hope for a more successful future for the undertaking, he said that they had made application to borrow a sum of £25,000. An inspector held an inquiry, and many inquiries were made as to the management and general position. The opposition had been left without a leg to stand on. If they had had a better lead at the start and more expert advice they would have saved thousands of pounds. Another member bore testimony to the ability and diligence of Messrs. Schofield and Blackmore, the chief officers.

**Mr. P. H. Marco,** general manager, Barnsley and District Tramways Company, presided at the annual dinner given by the company to the employees. Alderman Rose, who proposed the toast of the Tramway Company, said it was to the untiring efforts of Mr. Marco that the present position of the company was due. He had grappled with a very difficult period and brought about great improvements. Mr. Marco, in response, expressed the regret of his chairman (Mr. E. Garcke) and directors (Colonel Sir Thos. Pilkington, Bart., and Mr. E. A. Paris) at their inability to attend. He gave the staff the whole of the credit for doing their work so thoroughly and so well, and said he fully appreciated the fine work of his departmental officers, viz.: Mr. A. Wood, traffic superintendent; Mr. A. Kenworthy, department superintendent; Mr. J. Cocking, chief clerk; and Mr. McFayden, permanent way superintendent. Mr. Marco also expressed his gratification at the employees having won the Lansdowne "Devonshire Challenge Cup" for the best health record amongst the 30 or 40 associated companies of the Federation, three times in four years.

**Farewell Dinner to Mr. E. P. Grove.**—On July 22 Mr. E. P. Grove was entertained at a farewell dinner at the Trocadero Restaurant by a large number of his friends, and presented with a handsome silver cup. Mr. Grove, who has been connected with the Central London Railway as chief engineer for many years, has now proceeded to Melbourne as resident engineer for Messrs. Merz and McLellan, and will superintend the important electric railway installation to be carried out there. Dr. H. F. Parshall presided at the dinner, and Mr. Frank Bailey and Mr. A. L. C. Fell, also associates of Mr. Grove in various undertakings, were among those present. The speeches were reminiscent of pioneer days in electrical power work, and some amusing incidents were related, which greatly entertained the company. In our photograph Mr. Grove is seated between Dr. Parshall and Mr. Frank Bailey, while Mr. Fell is on Dr. Parshall's left. The arrangements for the dinner were largely due to Mr. A. H. Walton, who was cordially congratulated on the enjoyable programme which was so well carried out.

**Farewell Dinner to Mr. E. P. Grove on His Departure for Melbourne.—Dr. H. F. Parshall Presiding.**

**Mr. H. E. Blain** was entertained with Mrs. Blain at a social evening on July 9, by the staff of the West Ham Corporation Tramways and their friends, prior to the late manager of the undertaking taking up his new appointment on the staff of the London Underground Railways and Allied Companies. Mr. Blain was presented with a large handsome silver-mounted polished oak case, containing a three-bottle tantalus, with accompanying glasses, a card outfit, and a smoker's compendium. The presentation was made by Mr. F. Eggington, the principal assistant, who expressed deep sorrow at Mr. Blain's departure, whilst heartily congratulating him upon his new appointment. Mr. Blain, in acknowledging the presentation, said that he would value the gift as a most kindly remembrance of ten years' work. He thanked Mr. Eggington and the staff for their support, and extended a hearty welcome to the new manager, Mr. J. S. D. Moffet, whom he described as a capable, straight, and courteous gentleman. Mr. Moffet, who was present with his wife, thanked the staff for their welcome, and appealed for their loyal support. Mr. J. W. Beauchamp, the borough electrical engineer, referred to the personal loss he felt in the departure of Mr. Blain, and Mr. W. C. Ullmann, tramways manager, East Ham, voiced the regret felt in tramway circles, and particularly amongst the managers of the metropolitan area, at the change Mr. Blain was making, but cordially wished him success. Mr. Blain has also been entertained at dinner by the Metropolitan Association of Tramways Managers, of which he is the late chairman.

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## CONTRACTS AND ORDERS.

**Edgar Allen and Company** have received a contract for the supply of points and crossings to Southend Council.

**United Electric Car Company** have obtained the contract for supplying 14 top covers to Burnley tramways.

**Siemens-Schuckert, Limited,** have obtained a contract for the electrification of the Necochia (Argentina) tramways.

**Beecroft and Wrightman, Limited,** have received a contract to supply hard wood paving blocks to Bradford tramways.

**Mr. W. Dowling** has obtained a contract for the construction of a permanent way depot for the Belfast tramways, at £2,066.

**Walter Scott, Limited,** have been awarded a contract for the supply of Sandberg steel rails to Bournemouth tramways, at £5,535.

**Sturtevant Engineering Company, Limited,** are supplying a wet-air filter for turbo-generators to the Belfast electricity works, at £369.

**East Ham Council** have accepted the tender of Callender's Cable and Construction Company, at £55 10s., for the supply of a feeder pillar.

**Croydon Council** have accepted the tender of Le Grand and Sutcliffe, of London, for a deep-well pump for the electricity works, at £435.

**St. Helens Council** have awarded a contract to the British Westinghouse Electric and Manufacturing Company, Limited, for a rotary converter.

**West Ham Council** have accepted the tender of J. Baker and Company, of Rotherham, for supplying 32-in. steel tyres to the tramways department.

**Walthamstow Council** have placed a contract with the Blasberg Engineering Company for the erection of a natural draught cooling tower at the generating station, at £980.

**The Titan Trackwork Company, Limited,** have secured contracts from the Merthyr Tydfil Tramways, the Birkenhead Corporation Tramways, and the Pelotas Electric Tramways.

**Ramsbottom Traction Committee** have recommended the Council to accept the tender of the Lancashire Electric Power Company for a switchboard at the electricity works.

**Bolton Council** have accepted the tender of Newton, Chambers, and Company, Limited, for feed tanks, and that of Musgrave and Company, conditionally, for condensing plant.

**Commercial Cars, Limited,** of Luton, have orders in hand for motor passenger vehicles for Bath Electric Tramways, the Cheltenham Light Railway Company, and Grimsby Street Tramways.

**The Daimler Company, Limited,** have obtained a contract for the supply of spares and other accessories required for three motor omnibuses, to Rotherham tramways department, at £432.

**The M. and G. Truck and Engineering Company, Limited,** of 124 to 127, Minories, London, E.C., have received an order from Birmingham Corporation for maximum traction trucks for 75 cars.

**Regina City Commissioners,** Saskatchewan, have ordered from Bruce Peebles and Company, Limited, through that firm's Eastern Canadian agents, a 1,200-KW. motor converter (Peebles la Cour patents).

**Carlisle Council** have placed a contract with Pratchett Brothers for the supply and erection of a coal conveyor and bunker at £1,055, and with Babcock and Wilcox, Limited, for steam and water pipes at £395.

**British Thomson-Houston Company** have been awarded the contract for the supply of two 300-KW. rotary converters, with transformer switch gear, traction feeder, etc., to West Hartlepool electricity works.

**Leeds Tramways Committee** have recommended that the following tenders be accepted: 20 to 40 trucks for new cars, J. G. Brill and Company: 20 electrical equipments, with option to take a further 20, Dick, Kerr and Company.

**The Peckham Truck Company,** of Queen Anne's Chambers, Westminster, have recently received orders for two of their long wheel base radial trucks from the Liverpool Corporation Tramways, for use with the Mallins improved double-decked cars.

**Doncaster Council** have allotted the following contracts: Willans and Robinson, Limited, turbine and condenser, £3,308; British Westinghouse Company, Limited, one 350-KW. rotary converter, £1,074, and one 600-KW. rotary converter, £1,510.

**Newport Council** have accepted the following tenders: Switch gear (with British Thomson-Houston switches), Bertram Thomas; 100 tons of tramway rails at £7 15s. per ton, Walter Scott, Limited; rewinding turbo-alternator, General Electric Company.

**Walsall Council** have accepted the tender of the Harris Patent Feed Water Filter (1910) for a water softener for £345, and of Normans, Limited, for erecting a new steel and iron building for the additional boiler house at the electricity station for £307.

**Siemens Brothers' Dynamo Works** are supplying Tantalum traction lamps to Rochdale tramways, and have been awarded a contract for the annual supply of Wotan lamps for office lighting and of Tantalum lamps for car lighting to South Shields tramways.

**Keighley Council** have placed a contract with the Cedes Electric Traction Company, Limited, for a spare pair of hind wheels, with armatures complete, and a spare current collector and flexible wire to the disconnecting socket, for the railless trolley vehicles, at £123 10s.

**Stalybridge Joint Tramways Board** have accepted the following tenders in connection with the extensions to the generating station: Economisers, Goodbrand and Company; supply and erection of steelwork for boiler house, Ed. Wood and Company; feed water heater, Messrs. Babcock and Wilcox; weigh bridge, Ellis and Son.

**Manchester Council** have placed contracts as follow: Foundations and floor extensions at engine house, etc., for 15,000-KW. turbo-generator, William Gornall; for cable, W. T. Henley's Telegraph Works Company, Limited, B.I. and Helsby Cables, Limited, C. Macintosh and Company, Limited, and the Electrical Engineering and Equipment Company, Limited; supply of pitch to the tramways department, Simons-Carves, Limited.

**Sheffield Council** have awarded the subjoined contracts: Motor-driven surface condensing plant, capable of dealing with 75,000 lb. of exhaust steam per hour, £2,647, and 10 per cent. allowance for contingencies, and with a further allowance of £100 for the old condenser, British Westinghouse Company, Limited; hand travelling crane of 15 tons capacity, £375, Chatteris Engineering Works Company; direct-acting boiler feed pump, £190, J. F. Hall and Son, Limited.

**Glasgow Council** have been recommended to accept the following tenders: Special trackwork, Lorain Steel Company and E. Allen and Company; 10-ton travelling crane for Whitevale sub-station, Chambers, Scott, and Company; teak planks, J. Watt Torrance and Company, and Robinson, Dunn, and Company; mica, Micanite and Insulators Company, Limited; condenser for a new turbine at Pinkston power-station, Messrs. Willans and Robinson; engine, J. Jackson and Company. For the supply of tramway stores the following contracts have been made: E. W. Bliss Company and W. C. Yuille and Company, gear wheels; W. MacFarlane and Company, c.i. gutters; British Westinghonse Company, car equipments, motors, etc.; British Thomson-Houston Company, car equipments and controllers.

**St. Petersburg Tramway Extensions.**—On June 25 St. Petersburg Council awarded contracts as follow for the construction of new tramways during 1914-15:

(1) To the Kolomensk house for excavations, rectification of streets, and construction of the lines, if they accept the reduced price of 4,081,640 roubles (£425,500). Failing agreement with this offer, fresh tenders will be called for, and should these not induce lower offers, the work will be done under the direction of the town. (2) To the A.E.G. for the construction of the cable ways and cable systems at 1,229,000 roubles (£130,000), and for aerial cables at 1,164,326 roubles (£123,000), and for the equipment of the Poleustrovsky sub-station if the house will accept 101,651 roubles (£10,700), failing which the order will go to the Dynamo Company. (3) To the Dynamo Company for the supplementary equipment of the St. Petersburg and Podyatchesky sub-station at 115,000 roubles (£12,200).

As to the rolling stock orders already published, there is likelihood that the order for trailers will be withheld from the Swedish house, and given to a Russian one, owing to the protests raised against the order going abroad. The difference in favour of the Swedish tender is 47,000 roubles (£5,000) on a total of 1,026,000 roubles (£108,000). The Russian Metallurgical Combine, Prodameta, will supply the rails at a maximum of 1,250,435 roubles (£132,000), and the house of Pomerantr will supply the sleepers at a cost of 218,381 roubles (£23,100).

**London County Council** have accepted the following tenders: Stern Sonneborn Oil Company, cylinder oil for Greenwich power-station up to May 31, 1914, 1s. 5½d. a gallon, less 2½ per cent. monthly discount; C. Price and Company, machinery oil for Greenwich power-station, £11 10s a ton; W. Cory and Son, Limited, removal of ashes from Greenwich power-station for one year from August 1, 1s. 3d. per cubic yard; W. T. Henley's Telegraph Works Company, Limited, 880 yards of low-tension vulcanised bitumen insulated cable, £212 13s. 4d.; British Insulated and Helsby Cables, 50 cwts. of D.C.C., H.C.C. wire, £221 13s. 4d.; Electric Construction Company, charging apparatus for electrically-driven fire appliances at Hammersmith fire station, £158; Babcock and Wilcox, 50-ton overhead travelling crane for Greenwich power-station, £2,285; Burt, Boulton, and Haywood, 50,000 creosoted deal paving blocks required in connection with the diversion of tramway tracks in Wood Lane, delivered by van on the site, £7 6s. 10d. per thousand, total, £367 1s. 8d. The Highways Committee have reported, without mentioning the names of the firms, that they have arranged for the purchase of 100 cast steel wheel centres at the cost of £216 18s. 9d., and 1,000 plough leads and 3,500 sliding contact plough leads, at a cost of £518 15s.

**Bradford's Rolling Stock Requirements.**—For the year beginning April 1, 1914, the Tramways Committee propose to expend the following sums on rolling stock: 50 trucks, £4,050; 100 motors, £10,600; 50 resistances, £412; 100 circuit breakers, £215; 100 controllers, £2,400; 50 power brake sets, £2,500; 50 sets power circuits, £875; 10 car bodies rebuilding, £2,250, total £23,302, less £2,500 value of old equipment.

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## TRAMWAY AND LIGHT RAILWAY NOTES.

**BRIGHTON.**—As many visitors do not care to pay a shilling to go round in a tourist car, it has been decided to issue visitors' tickets for a journey round the Beaconsfield Ditchling circular route, and, in addition, to either the Dyke Road terminus or the Race Hill, or Queen's Park terminus and back, at a combined charge of sixpence.—On the recommendation of the manager, the Tramways Committee advised the Council to apply to the Board of Trade to change several compulsory stops to optional stops, several being on descending journeys. The Council, however, referred the report back for further consideration.

**GLASGOW.**—The three tunnels under the Clyde which were closed in 1907 owing to ferry boat competition immediately above the line of the tunnels, were reopened for traffic in July. There are three tunnels, two feet apart, all on the same level under the Clyde. The centre tunnel is intended for passenger traffic only, and meantime will not be in use. The west tunnel is used for north-going traffic, and the east for south-going traffic. There are six lifts in each shaft, but generally four lifts only are operated and one kept spare. An agreement has been arranged between the Tunnel Company and the Corporation for the reopening to take place for one year, with an option to the Corporation to purchase the undertaking for £100,000. Members of the Statute Labour Committee and the Tramways Committee attended the opening ceremony, and made an inspection of the works under the guidance of Mr. J. Dalrymple, the tramways manager, and the company's officials.

**HUDDERSFIELD.**—In order to secure an extension of the Huddersfield tramways to Elland and West Vale, the local authorities have agreed to pay £2,350 towards the cost of widenings. In return for this offer the Corporation have withdrawn a stipulation that Elland should pay £100 per year for five years in the event of the tramways resulting in loss.

**LONDON.**—Early last year the County Council, acting on their statutory powers, framed by-laws, which were approved by the Board of Trade, relating to the use of special cars for special purposes. At the meeting of the Council on July 15 the Highways Committee reported that the by-laws had now been amended so as to provide for the imposition of a penalty for their contravention, and that the Board of Trade had allowed such amendment, providing among other things that no male person shall, unless duly authorised by the Council, board any tramcar which is run and reserved for female persons only, under liability to a penalty not exceeding 40s. on conviction. The need for the amended by-law has arisen in connection with the early morning cars for women.—Owing to the large number of cars now being fitted with trolleys and plough collectors for through running on other tramways and on mixed systems on the Council routes, authority has been given for obtaining tenders from selected firms for the supply of 1,000 ordinary leads and 3,500 sliding contact leads.—Authority was given to the Highways Committee on July 5 to advertise the facilities afforded by the tramways by means of illuminated advertisements on certain tramway buildings and other sites, and to obtain tenders from selected firms for the provision of the signs required.—In order to relieve the congestion of traffic near Rye Lane, the County Council have agreed to install a tramway lay-by in Harders Road, Peckham, at an estimated cost of £2,250.—Arrangements have been concluded for repairing, at the cost of the London County Council, the West London lines of the London United Tramways Company which are within the county boundary. These lines are about to be taken over by the Council. The cost of the work at present arranged for is £19,700, but the total expenditure contemplated for the reconstruction of nearly eight miles single track is £51,800.

**MANCHESTER.**—The Tramways Committee, on July 22, received a petition containing 3,553 signatures in favour of an all-night service of tramcars or motor omnibuses. Dr. Chapman, the vice-chairman, stated that Mr. McElroy, the manager, was a short time ago instructed to submit a report on the question, but owing to his visit to America had not yet been able to do so. The committee, immediately on receipt of Mr. McElroy's report, would take the matter in hand. "Members of the committee," Dr. Chapman said, "are deeply interested in this matter, and you may depend upon it that if a night service can be put on it will be."

**MIDDLESEX.**—Acton Council have referred to committee a proposal by the Middlesex County Council to link up their tramways with those of the London United Electric Tramways Company.

**MORECAMBE.**—The Tramways Committee have instructed the borough electrical engineer to prepare an estimate for the electrification of the horse tramways.

**PORTSMOUTH.**—Great interest was displayed at Portsmouth at the opening of an extension of the tramways from the Recreation Ground and Commercial Road on July 4. The decision of the Council to construct tramways to the populous district of Stamshaw was mainly due to the efforts of Councillor J. Timpson, vice-chairman of the Tramways Committee, whose health was proposed by the Mayor

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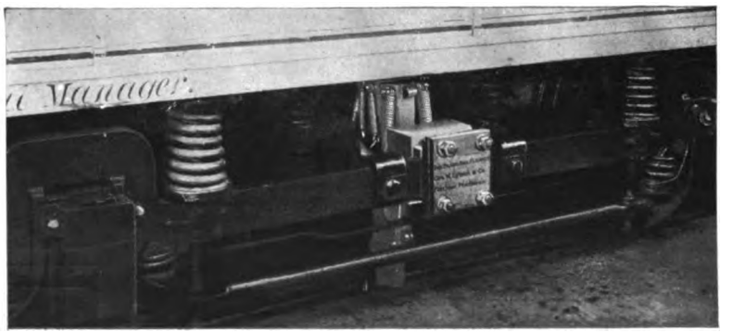

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(Alderman J. H. Corke), the chairman of the committee, during a few speeches following the inaugural ride. Mr V. G. Lironi, the electrical and permanent way engineer, at the request of the Mayor, described the work connected with the extension, which has cost £10,750, and details as to the service to be run were given by Mr. W. R. Spaven, the manager. Councillor Timpson paid a tribute to the work of Mr. Spaven, Mr. Lironi, and Mr. Roscoe, the assistant electrical engineer, and Mr. Lewis, the civil engineer.

**READING.**—A report has been presented to the Council recommending a tramways extension of about a quarter of a mile, and four trackless trolley routes of slightly more than eight miles total length, with a further provision for motor omnibuses for trying new routes. The total cost of the scheme is over £26,000, and the Council decided to consider it in committee.

**SWANSEA.**—The Light Railway Commissioners have granted an Order for the construction of tramways on Town Hill as recommended in a scheme prepared for the Town Council by Mr. Stephen Sellon. The object of the proposal is to develop Corporation lands for the provision of workmen's and other dwellings.

## LONDON TRAMWAYS RENEWAL FUND.

NO SUM AVAILABLE—QUESTION ADJOURNED FOR TWO YEARS.

At the meeting of London County Council on July 8 a special report of the Highways Committee on the tramways renewal fund and general reserve fund was adopted. The report pointed out that on June 23, 1908, the Council decided that provision should be made for renewals in respect of the tramways undertaking at the rate of two-thirds of a penny per car-mile, and that the question of the adequacy of this provision should again be considered at the expiration of five years. The provision of two-thirds of a penny was the result of a careful computation based on the lives of certain parts of the undertaking, consisting of the permanent way, cables, machinery at Greenwich station, petrol motor cars, petrol lorries, steam lorries, ticket vans, cable vans, and sundry horse vehicles. No provision was made in respect of renewal of cars, car traversers, cable ducts, tracks in the car sheds and foundations for the permanent way and the renewal of certain sub-station machinery, switch gear, and sundry plant and tools, as work of this nature is paid for directly out of revenue. Of a total expenditure to March 31 last of £7,521,036 on items the repayment of which was spread over 25 years, only about £2,974,000 was covered by the renewals fund, the remainder being renewed out of revenue account.

The recent falling off in traffic receipts owing to the great increase in motor omnibus competition had the effect of bringing to a negligible figure the surplus for 1912-13 to be added to the renewals fund, and the surplus for the current year would be very small unless conditions were materially altered. The question of the rate per car-mile required became therefore for the moment an academic one. At the same time it was desirable to review the position. Taking the capital cost of the items for which renewals provision should be made, and providing (by cumulative annuity) for the renewal, the annual provision would be as cited below.

| | Annual provision for the renewal. | Amount per car-mile.* |
|---|---|---|
| | £ | d. |
| Permanent way—surface work only, excluding slot rails, but including electrical equipment ... ... ... ... | 116,304 | ·498 |
| Generating station machinery and plant .. ... ... ... | 13,235 | ·057 |
| Sub-station machinery and plant... ... ... ... ... | 6,566 | ·028 |
| Cables and feeder pillars..... ... ... ... ... ... | 9,497 | ·041 |
| Machinery and plant in central car repair depot and other depots ... ... ... ... ... ... ... ... ... | 1,319 | ·006 |
| Motor cars, lorries, wagons, carts, etc. ... ... ... ... | 1,182 | ·005 |
| Total ... ... ... ... ... ... ... ... | £148,103 | ·635 |

* Based on 56,000,000 miles.

It was very difficult to estimate the amount required for renewals beyond the next five years, but it was considered that an average expenditure of about £139,000 a year, equal to ·595d. per car-mile, would be sufficient. On March 31 last the renewals fund amounted to £633,010, while in addition there was the general reserve fund amounting to £273,786. In view of the impracticability under existing conditions of estimating the amount that would be available for renewals there appeared to be no practical advantage in revising the basis at present, and the committee were of opinion that there should be carried to the renewals fund the actual surplus each year, leaving the question of a possible revision of the basis for a further period of two years. In regard to the reserve fund, nothing was available to be carried to it for the year 1912-13, and it was not estimated that there would be any sum available for the year 1913-14. It therefore did not appear necessary that any decision as to the constitution of this fund should be come to at present. The Finance Committee agreed with the Highways Committee, and said that they had adjourned the matter of the reserve fund for two years.

## PATENT LIST.

**Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.**

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS.

Applications for Letters Patent have been filed:

14,440 Pull-down inverted seat for omnibuses, etc.—A. J. Heron.
14,446 Apparatus for cutting or lowering the check rail or other surfaces on tramways or railways R. Stirk.
14,459 Operating mechanism of sand-discharge valves for electrically propelled vehicles—J. F. Simpson.
14,462 Control mechanism of power-propelled vehicles—Daimler Company, Limited, and E. C. Horsley.
14,467 Life guard for motor omnibuses—G. T. Corrie.
14,501 Automatic life-guard S. Simmins.
14,519 Rail joints—J. Wattmann and Tudor Accumulator Co., Ltd.
14,542 Motor traction P. W. Brown.
14,650 Front life-guards for motor omnibuses—W. Freakley.
14,762 Life-guards for motor omnibuses S. E. Williams.
14,771 Electric signals for railways—A. R. Mutton.
14,796 Electric motor control systems—British Thomson-Houston Company, Limited (*General Electric Company*).
14,831 Construction of wheels of motor vehicles—C. S. Challiner and J. A. Challiner.
14,876 Guards for motor vehicles A. F. Davis.
14,898 Vacuum brakes for railway vehicles—G. Paget.
14,906 Signalling apparatus for railways—J. W. Brunskill.

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14,981 Life-guard for motor omnibuses—F. Gore.
15,013 Life-guard for the front of motor omnibuses—L. le Bosse.
15,077 Folding or extensible car step—H. D. Kirkley.
15,121 Collection of fares on omnibuses, tramways, and railway cars—E. Peckham.
15,125 Front-guards for motor omnibuses—W. Courtness.
15,149 Change-over arrangements for electric supply or control systems—Siemens Brothers Dynamo Works, Limited, F. Lydall, and C. E. Fairburn.
15,178 Means for preventing railroad rails from creeping—M. L. Phelps.
15,205 Fluid-pressure braking apparatus—W. V. Turner.
15,208 Mechanical revolving guard for motor omnibuses—W. Wye.
15,245 Guards for motor omnibuses—P. C. Sarapata.
15,381 Track construction—J. Noll.
15,407 Expanding joint for rails—J. Thornycroft.
15,453 Guard for motor omnibuses—W. Knott.
15,498 Power-operated brakes—E. V. Hartford.
15,516 Means of using auxiliary petrol-electric supply for electric rail cars, trackless trolley vehicles, etc.—W. A. Stevens.
15,658 Electric railways—C. M. White (*M. E. Sturges*).
15,701 Car fenders—J. A. MacMahon and J. T. Warden.
15,744 Guard for motor omnibuses—A. E. Beecher-Brigden.
15,286 Guard for motor omnibuses, etc—E. W. Evans.
15,886 Life-saving device for motor vehicles, trams, etc.—E. A. Higham and F. Flint.
15,907 Life-guard—J. R. J. Amor.
16,076 Top-deck seating arrangements for motor omnibuses—W. J. Hickman.
16,112 Guard for motor omnibuses—A. E. Gibbs.
16,177 Safety appliances for motor omnibuses—V. G. Burtonshaw.
16,193 Apparatus for controlling traffic on single-line railways—W. E. Tyer and Tyer and Company.
16,196 Front guards for motor cars, omnibuses, etc.—F. Tye.
16,281 Trucks for tramcars—M. E. Curwen (*J. G. Brill Company*).
16,294 Rail joint—E. H. C. Rayn.
16,343 Guards for vehicles—J. H. Davies.
16,347 Life-guards for motor omnibuses—A. G. Evans
16,588 Power transmission and propulsion for self-propelled vehicles—D. Marshall.
16,597 Mechanism for indicating the positions of trains, trams, and road vehicles—B. Davies.
16,602 Wheel-guard or obstruction remover for motor and tramway vehicles—W. J. Gooding and D. A. Sweeney.
16,705 Trolley heads for overhead electric traction—E. H. Underwood.
16,817 Passenger cars—P. N. Jones.
16,837 Rail joints—C. S. Broomhall.
16,861 Automatic brake mechanism for railway trains—J. Jacoubof.
16,897 Life-guards for motor omnibuses—G. A. Spencer.
17,005 Axle boxes for tramway and railroad vehicles—C. Delmez.
17,051 Guards for motor omnibuses—E. E. Haynes.
17,087 Trucks for railway and tramway vehicles—J. A. Brooks.
17,088 Brake mechanism for railways and tramways—J. A. Brooks.
17,093 Collapsible covers or roofs for motor omnibuses, tramcars, etc.—G. M. Giles.
17,103 Automatic reversible seat for motor omnibuses—C. Katz.
17,129 Track system for railways—M. G. Fernandez.

## Specifications Published.

1912.

13,208 Electrical signalling apparatus—Chapman (*Chapman*).
13,426 Tickets—International P-A-Y-E Tramcar Co. and Tanner.
22,034 Railway and road passenger vehicles—Rowntree.
5,703 Electrically-controlled point mechanism for railways—Collins.
14,119 Supports for route indicator boards—Goodwin and London General Omnibus Company.
21,927 Tramway tracks—Starke.
14,029 Apparatus for applying tyres to the wheels of tramway vehicles—Cowley and Taylor.
14,584 Railway and road passenger vehicles—International P-A-Y-E Tramcar Company and Tanner.
17,116 Tramway points—Crosta and Hill.
9,637 Apparatus for actuating conduit covers and collector ploughs of electric railways—Samaia.
29,828 Railway chairs and chair keys—Imray (*Stephenson*).

1913.

218 Alumino-thermic and similar methods of uniting railway and tramway rails—Th. Goldschmidt Akt.-Ges.
413 Chairs for railway rails—Dumartin.
2,886 Securing railway rails to sleepers—Stephenson and Stephenson.
8,147 Car replacers—Calhoun.
142 Railway points and switches—Steedman.
4,340 Devices for preventing railroad rails from moving lengthwise—Vaughan.
7,117 Car couplings—Pendexter.

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# TRAFFIC RETURNS.

## TRAMWAYS AND OMNIBUSES.

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | | 1913. WEEKS ENDING. | | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | June 29. | July 6. | July 13. | July 20. | July 27. | June 28. | July 5. | July 12. | July 19. | July 26. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Aberdeen Corporation ... ... | 1,577 | 1,590 | 1,622 | 1,804 | 1,899 | 1,591 | 1,710 | 1,570 | 1,699 | 2,041 | 8 | 12,925 | + 339 |
| Ayr Corporation ... ... ... | 354 | 410 | 528 | 1,130 | 606 | 394 | 463 | 420 | 578 | 1,248 | 10 | 4,907 | + 149 |
| Bath Electric ... ... ... | 1,007 | 1,001 | 1,103 | 1,105 | 1,037 | 1,194 | 1,236 | 1,226 | 1,286 | 1,173 | 30 | 27,094 | + 1,014 |
| Birmingham Corporation ... ... | 10,760 | 10,860 | 10,904 | 10,824 | 10,728 | 11,411 | 11,884 | 11,513 | 11,582 | 11,371 | 17 | 193,860 | + 13,547 |
| Blackburn Corporation ... ... | 1,260 | 1,220 | 1,317 | 1,345 | 1,186 | 1,289 | 1,319 | 1,388 | 1,638 | 1,356 | 17 | 22,568 | + 1,672 |
| Blackpool and Fleetwood ... ... | 818 | 1,638 | 1,342 | 1,268 | 1,301 | 904 | 1,673 | 1,483 | 1,282 | 1,577 | 4 | 5,559 | + 260 |
| Blackpool Corporation ... ... | 1,368 | 2,632 | 3,165 | 2,497 | 2,512 | 1,689 | 2,784 | 2,664 | 2,528 | 2,909 | 16 | 27,720 | + 1,989 |
| Bolton Corporation ... ... | 2,629 | 2,595 | 2,738 | 2,684 | 2,692 | 2,809 | 2,666 | 3,112 | 2,830 | 2,870 | 17 | 46,531 | + 2,192 |
| Bournemouth Corporation ... | 1,813 | 1,949 | 2,069 | 2,002 | 1,953 | 2,110 | 2,016 | 2,244 | 2,292 | 2,406 | 17 | 35,485 | + 3,213 |
| Bradford Corporation ... ... | 5,610 | 5,577 | 6,155 | 6,011 | 5,411 | 5,971 | 6,282 | 5,988 | 6,224 | 6,006 | 17 | 101,094 | + 4,530 |
| Brighton Corporation ... ... | 1,263 | 1,113 | 1,171 | 1,183 | 1,300 | 1,375 | 1,139 | 1,188 | 1,181 | 1,246 | 17 | 17,894 | - 61 |
| Bristol ... ... ... ... | 8,421 | 7,688 | 7,818 | 7,804 | 7,555 | 8,890 | 13,260 | 9,503 | 9,344 | 8,924 | 29 | 230,214 | + 29,877 |
| British Elec. Trac. Co's. Undertakings | | | | | | | | | | | | | |
| Airdrie ... ... ... ... | 326 | 312 | 387 | 345 | 262 | 400 | 406 | 360 | 389 | 454 | 30 | 10,081 | + 1,460 |
| Barnsley ... ... ... ... | 197 | 193 | 209 | 195 | 183 | 340 | 369 | 366 | 369 | 356 | 30 | 7,879 | + 2,838 |
| Barrow ... ... ... ... | 426 | 471 | 480 | 527 | 501 | 469 | 488 | 444 | 482 | 519 | 30 | 11,627 | + 588 |
| Birmingham and Mid. Joint Com. : | | | | | | | | | | | | | |
| Birmingham and Midland ... | 975 | 943 | 987 | 1,018 | 945 | 984 | 994 | 965 | 989 | 971 | 30 | 29,932 | + 1,339 |
| Dudley-Stourbridge ... ... | 902 | 890 | 979 | 1,011 | 932 | 1,021 | 1,009 | 956 | 1,100 | 1,024 | 30 | 27,505 | + 2,323 |
| South Staffordshire ... ... | 953 | 926 | 974 | 1,003 | 942 | 943 | 944 | 924 | 953 | 976 | 30 | 29,457 | + 2,130 |
| Wolverhampton District ... | 482 | 483 | 585 | 516 | 482 | 498 | 517 | 570 | 505 | 519 | 30 | 15,180 | + 1,090 |
| Devonport ... ... ... ... | 578 | 587 | 516 | 570 | 537 | 582 | 660 | 640 | 624 | 580 | 30 | 15,990 | + 156 |
| Gateshead ... ... ... ... | 1,310 | 1,038 | 1,094 | 1,122 | 1,098 | 1,687 | 1,442 | 1,526 | 1,581 | 1,610 | 30 | 36,366 | + 6,090 |
| Gravesend and Northfleet ... | 197 | 199 | 209 | 214 | 209 | 245 | 269 | 269 | 268 | 258 | 30 | 6,756 | + 756 |
| Greenock-Port Glasgow ... ... | 912 | 1,025 | 686 | 983 | 924 | 1,028 | 1,145 | 789 | 879 | 1,292 | 30 | 25,145 | + 1,691 |
| Jarrow ... ... ... ... | 210 | 138 | 146 | 151 | 148 | 226 | 161 | 150 | 171 | 163 | 30 | 4,239 | + 240 |
| Kidderminster ... ... ... | 138 | 129 | 174 | 169 | 146 | 141 | 194 | 150 | 153 | 153 | 30 | 3,457 | + 85 |
| Merthyr... ... ... ... | 368 | 211 | 207 | 225 | 208 | 222 | 239 | 223 | 237 | 231 | 30 | 6,429 | + 710 |
| Metropolitan Electric ... ... | 9,640 | 9,185 | 9,711 | 9,714 | 9,109 | 9,777 | 10,118 | 9,139 | 9,668 | 9,326 | 30 | 266,970 | + 5,309 |
| Middleton ... ... ... ... | 387 | 358 | 425 | 439 | 362 | 389 | 395 | 413 | 446 | 402 | 30 | 10,395 | + 563 |
| Oldham-Ashton ... ... ... | 653 | 628 | 679 | 682 | 630 | 650 | 645 | 673 | 734 | 650 | 30 | 18,312 | + 323 |
| Peterborough ... ... ... | 172 | 186 | 326 | 155 | 151 | 197 | 215 | 405 | 232 | 199 | 30 | 4,995 | + 1,006 |
| Potteries ... ... ... ... | 2,031 | 2,206 | 2,174 | 2,153 | 1,966 | 2,064 | 2,264 | 2,061 | 2,077 | 2,074 | 30 | 62,126 | + 7,182 |
| Rothesay ... ... ... ... | 295 | 506 | 478 | 1,153 | 657 | 362 | 505 | 552 | 472 | 1,173 | 30 | 6,204 | + 306 |
| Sheerness ... ... ... ... | 56 | 57 | 63 | 62 | 60 | 58 | 58 | 65 | 72 | 67 | 30 | 1,526 | + 105 |
| South Metropolitan ... ... | 949 | 898 | 1,013 | 955 | 942 | 937 | 1,028 | 879 | 883 | 868 | 30 | 24,409 | - 553 |
| Southport ... ... ... ... | 330 | 391 | 398 | 386 | 383 | 352 | 413 | 477 | 377 | 383 | 30 | 9,117 | + 494 |
| Swansea... ... ... ... | 1,172 | 1,223 | 1,224 | 1,253 | 1,252 | 1,290 | 1,497 | 1,333 | 1,376 | 1,325 | 30 | 36,690 | + 3,620 |
| Taunton ... ... ... ... | 48 | 48 | 49 | 50 | 49 | 45 | 51 | 48 | 54 | 55 | 30 | 1,396 | + 106 |
| Tynemouth ... ... ... ... | 504 | 313 | 371 | 406 | 412 | 580 | 403 | 360 | 391 | 414 | 30 | 7,239 | + 545 |
| Weston-super-Mare ... ... | 197 | 334 | 331 | 400 | 354 | 278 | 327 | 340 | 395 | 416 | 30 | 3,900 | + 550 |
| Worcester ... ... ... ... | 326 | 353 | 347 | 357 | 353 | 377 | 425 | 407 | 405 | 410 | 30 | 8,946 | + 530 |
| Wrexham and District ... ... | 119 | 135 | 124 | 124 | 118 | 132 | 144 | 128 | 136 | 137 | 30 | 3,564 | + 331 |
| Yorks. (Woollen) District ... | 1,155 | 1,102 | 1,292 | 1,182 | 1,230 | 1,189 | 1,210 | 1,191 | 1,227 | 1,364 | 30 | 34,220 | + 2,386 |

*(Continued on page 136.)*

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# TRAFFIC RETURNS—Tramways and Omnibuses—*continued.*

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. June 29. | July 6. | July 13. | July 20. | July 27. | 1913. WEEKS ENDING. June 28. | July 5. | July 12. | July 19. | July 26. | AGGREGATE. Wks. | 1913. | Increase or Decrease. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Burnley Corporation ... ... | 1.457 | 1.470 | 1.445 | 1.501 | 1.513 | 1.623 | 1.659 | 1.631 | 1.651 | 1.750 | 17 | 28.162 | + 2.957 |
| Burton-on-Trent Corporation ... | 282 | 291 | 297 | 303 | 295 | 277 | 288 | 287 | 280 | 288 | 17 | 4.806 | + 89 |
| Bury Corporation ... ... ... | 1.283 | 1.420 | 1.406 | 1.327 | 1.281 | 1.359 | 1.423 | 1.516 | 1.390 | 1.431 | 17 | 23.357 | + 575 |
| Cardiff Corporation ... ... | 3.876 | 2.573 | 2.580 | 2.706 | 2.586 | 2.887 | 2.920 | 2.871 | ... | ... | 15 | 40.016 | + 4.167 |
| Chatham and District ... ... | 895 | 917 | 956 | 981 | 886 | 953 | 1.064 | 988 | 1.055 | 947 | 29 | 26.124 | + 1.255 |
| Chesterfield Corporation ... ... | 231 | 250 | 235 | 285 | 229 | 252 | 274 | 242 | 253 | 250 | 16 | 4.148 | + 471 |
| Colne and Trawden ... ... | 268 | 274 | 322 | 300 | 285 | 277 | 306 | 370 | 299 | 307 | 30 | 7.996 | + 405 |
| Cork Electric ... ... ... | 529 | 545 | 550 | 596 | 501 | 555 | 613 | 564 | 595 | 579 | 29 | 14.338 | - 38 |
| Croydon Corporation ... ... | 1.953 | 1.870 | 1.991 | 1.944 | 1.906 | 1.742 | 1.830 | 1.627 | 1.697 | 1.641 | 16 | 27.914 | - 4.183 |
| Darlington Corporation ... ... | 254 | 233 | 243 | 237 | 235 | 257 | 250 | 245 | 252 | 265 | 17 | 4.225 | + 392 |
| Derby Corporation ... ... | 937 | 917 | 1.016 | 995 | 958 | 986 | 1.010 | 986 | 1.008 | 989 | 17 | 16.614 | + 1.878 |
| Dover Corporation ... ... | 253 | 266 | 311 | 292 | 300 | 249 | 255 | 269 | 280 | 274 | 17 | 4.053 | - 193 |
| Dublin and Lucan ... ... | 240 | 94 | 158 | 186 | 157 | 309 | 76 | 184 | 173 | 213 | 3½ | 646 | + 51 |
| Dublin United ... ... ... | 6.408 | 6.661 | 6.337 | 7.010 | 5.907 | 6.436 | 7.709 | 6.071 | 6.223 | 6.823 | 29 | 174.969 | + 2.944 |
| Dundee City ... ... ... | 1.243 | 1.254 | 1.223 | 1.287 | 1.336 | 1.297 | 1.369 | 1.279 | 1.294 | 1.422 | 10 | 13.260 | + 935 |
| East Ham Corporation ... ... | 1.052 | 1.054 | 1.113 | 1.107 | 1.086 | 995 | 1.026 | 955 | 961 | 942 | 17 | 17.628 | - 364 |
| Exeter Corporation ... ... | 365 | 344 | 346 | 373 | 358 | 359 | 407 | 377 | 372 | 376 | 17 | 5.766 | + 105 |
| Glasgow Corporation ... ... | 20.015 | 19.152 | 19.132 | 15.007 | 16.045 | 20.860 | 20.845 | 19.518 | 19.676 | 14.921 | 8 | 158.863 | + 11.245 |
| Glossop (Urban Elec. Supply Co.).. | 131 | 131 | 138 | 138 | 130 | 130 | 133 | 135 | 128 | 137 | 30 | 3.828 | + 464 |
| Halifax Corporation ... ... | 2.282 | 2.068 | 2.175 | 2.712 | 2.061 | 2.214 | 2.320 | 2.142 | 2.211 | 2.273 | 16 | 34.715 | - 534 |
| Hastings and District ... ... | 1.057 | 1.054 | 1.201 | 1.232 | 1.219 | 1.035 | 1.177 | 1.101 | 1.296 | 1.212 | 30 | 27.495 | + 1.231 |
| Huddersfield Corporation ... ... | 2.038 | 1.983 | 2.324 | 2.043 | 1.970 | 2.142 | 2.189 | 2.125 | 2.169 | 2.194 | 17 | 36.200 | + 1.960 |
| Hull Corporation ... ... ... | 2.915 | 2.954 | 2.988 | 2.988 | 2.856 | 3.114 | 3.087 | 3.128 | 3.082 | 2.974 | 17 | 51.565 | + 2.795 |
| Ilford U.D. Council ... ... | 552 | 553 | 576 | 563 | 540 | 483 | 492 | 460 | 457 | 449 | 17 | 7.808 | - 1.395 |
| Ilkeston Corporation ... ... | 139 | 129 | 138 | 124 | 125 | 137 | 136 | 142 | 133 | 141 | 18 | 2.319 | + 471 |
| Ipswich Corporation ... ... | 469 | 515 | 530 | 536 | 548 | 488 | 517 | 499 | 520 | 516 | 17 | 7.721 | - 15 |
| Isle of Thanet ... ... ... | 901 | 1.017 | 1.273 | 1.313 | 1.411 | 955 | 1.129 | 1.315 | 1.283 | 1.413 | 43 | 21.354 | + 465 |
| Kilmarnock Corporation ... ... | 167 | 157 | 173 | 186 | 251 | 172 | 174 | 171 | 179 | 203 | 10 | 1.870 | + 30 |
| Lanarkshire ... ... ... | 1.581 | 1.667 | 1.574 | 1.875 | 1.349 | 1.750 | 1.844 | 1.637 | 1.714 | 1.845 | 29 | 48.475 | + 6.384 |
| Lancashire United ... ... | 1.425 | 1.483 | 1.630 | 1.548 | 1.357 | 1.580 | 1.681 | 1.578 | 1.723 | 1.561 | 29 | 43.208 | + 4.164 |
| Leeds City ... ... ... | 8.141 | 8.062 | 8.539 | 8.293 | 7.835 | 8.403 | 8.783 | 8.250 | 8.519 | 8.564 | 17 | 140.948 | + 8.677 |
| Leicester Corporation ... ... | 2.737 | 2.758 | 2.838 | 2.756 | 2.905 | 3.003 | 2.942 | 2.805 | 2.893 | 3.031 | 30 | 82.883 | + 7.795 |
| Leith Corporation... ... ... | 778 | 769 | 877 | 887 | 763 | 752 | 819 | 755 | 786 | 763 | 10 | 7.806 | + 127 |
| Liverpool Corporation ... ... | 12.315 | 12.856 | 12.924 | 12.847 | 12.602 | 13.172 | 13.750 | 17.097 | 14.650 | 13.819 | 29½ | 378.979 | + 26.756 |
| Llandudno and Colwyn Bay ... | 363 | 489 | 488 | 541 | 569 | 417 | 500 | 546 | 556 | 661 | 34 | 9.124 | + 902 |
| London County Council ... ... | 43.884 | 43.479 | 43.667 | 44.213 | 42.015 | 42.997 | 43.445 | 42.350 | 42.745 | 41.997 | 16 | 690.329 | - 23.096 |
| London General Omnibus... ... | 57.726 | 58.624 | 61.481 | 59.570 | 59.881 | 72.466 | 71.548 | 66.862 | 66.505 | 68.381 | 30 | 1,849.062 | +396.496 |
| London United ... ... ... | 7.177 | 6.730 | 7.299 | 7.493 | 7.096 | 7.304 | 7.716 | 6.582 | 7.189 | 7.054 | 30 | 182.978 | - 2.376 |
| Lowestoft Corporation ... ... | 173 | 210 | 296 | 311 | 338 | 219 | 219 | ... | ... | 308 | 42 | 7.507 | + 307 |
| Maidstone Corporation ... ... | 200 | 209 | 213 | 247 | 217 | 210 | 233 | 203 | 213 | 237 | 17 | 3.423 | + 159 |
| Manchester Corporation ... ... | 17.218 | 17.455 | 18.102 | 17.351 | 16.436 | 17.597 | 18.239 | 18.056 | 19.750 | 17.605 | 17 | 299.850 | + 14.354 |
| Nelson Corporation ... ... | 193 | 153 | 213 | 210 | 197 | 232 | 173 | 242 | 208 | 257 | 17 | 3.572 | + 150 |
| Newcastle-on-Tyne Corporation ... | 7.070 | 4.283 | 4.391 | 4.398 | 4.331 | 8.076 | 4.616 | 4.648 | 4.812 | 4.666 | 17 | 81.521 | + 6.424 |
| Newport (Mon.) Corporation ... | 729 | 738 | 741 | 766 | 761 | 769 | 796 | 771 | 780 | 784 | 17 | 12.612 | + 723 |
| New St. Helens and District ... | 805 | 823 | 909 | 915 | 783 | 838 | 887 | 1.038 | 1.061 | 837 | 4 | 3.150 | + 351 |
| Northampton Corporation... ... | 573 | 567 | 622 | 627 | 571 | 591 | 630 | 576 | 646 | 561 | 16½ | 9.670 | + 208 |
| Nottingham Corporation ... ... | 3.254 | 3.236 | 3.387 | 3.389 | 3.197 | 3.332 | 3.349 | 3.384 | 3.365 | 3.302 | 16½ | 55.121 | + 1.585 |
| Oldham Corporation ... ... | 2.049 | 2.164 | 2.262 | 2.155 | 2.077 | 2.166 | 2.234 | 2.626 | 2.356 | 2.357 | 18 | 39.408 | + 2.055 |
| Portsmouth Corporation ... ... | 2.170 | 2.573 | 2.932 | 2.515 | 2.447 | 2.587 | 2.790 | 2.584 | 2.587 | 2.504 | 17 | 37.805 | - 443 |
| Preston Corporation ... ... | 781 | 844 | 846 | 865 | 817 | 804 | 839 | 1.117 | 837 | 861 | 17 | 15.013 | + 1.135 |
| Provincial... ... ... ... | 2.004 | 2.043 | 2.171 | 2.172 | 2.486 | 2.119 | 2.418 | 2.302 | 2.349 | 2.382 | 43 | 76.146 | + 3.717 |
| Reading Corporation ... ... | 696 | 656 | 714 | 722 | 663 | 713 | 731 | 702 | 753 | 704 | 16 | 11.297 | + 518 |
| Rochdale Corporation ... ... | 1.499 | 1.598 | 1.740 | 1.727 | 1.613 | 1.574 | 1.673 | 1.854 | 1.686 | 1.710 | 17 | 27.273 | + 490 |
| Rotherham Corporation ... ... | 749 | 815 | 768 | 737 | 754 | 974 | 965 | 970 | 989 | 1.056 | 17 | 16.758 | + 4.338 |
| Salford Corporation ... ... | 5.102 | 5.434 | 5.436 | 4.951 | 4.938 | 5.275 | 5.350 | 6.211 | 5.247 | 5.278 | 17 | 90.041 | + 2.472 |
| Sheffield Corporation ... ... | 6.835 | 6.867 | 7.077 | 6.669 | 6.711 | 7.395 | 7.542 | 7.318 | 7.367 | 7.303 | 18 | 130.560 | + 12.900 |
| Southampton Corporation... ... | 1.358 | 1.363 | 1.363 | 1.444 | 1.387 | 1.337 | 1.412 | 1.354 | 1.423 | 1.435 | 16 | 21.308 | + 411 |
| Southend-on-Sea Corporation ... | 842 | 886 | 961 | 1.079 | 1.014 | 992 | 1.089 | 1.090 | 1.151 | 1.185 | 17 | 14.689 | + 1.443 |
| South Shields Corporation ... | 806 | 662 | 671 | 685 | 692 | 919 | 744 | 733 | 806 | 755 | 16 | 12.069 | + 1.473 |
| Sunderland Corporation ... ... | 1.391 | 1.382 | 1.439 | 1.362 | 1.365 | 1.622 | 1.532 | 1.505 | 1.588 | 1.520 | 17 | 24.230 | + 2.429 |
| Swindon Corporation ... ... | 153 | 157 | 163 | 149 | 145 | 168 | 174 | 170 | 132 | 152 | 16 | 2.630 | + 187 |
| Tramways (M.E.T.) Omnibus Co. ... | ... | ... | ... | ... | ... | 5.433 | 5.826 | 5.815 | 6.663 | 7.845 | 30 | 85.216 | — |
| Tyneside Tramways and Tramroads | 1.557 | 600 | 508 | 556 | 519 | 1.711 | 815 | 501 | 562 | 561 | 4 | 1.746 | - 10 |
| Wallasey Corporation ... ... | 1.167 | 1.227 | 1.242 | 1.312 | 1.222 | 1.237 | 1.341 | 1.470 | 1.334 | 1.323 | 17 | 20.833 | + 1.409 |
| Walsall Corporation ... ... | 597 | 593 | 607 | 615 | 615 | 603 | 625 | 614 | 623 | 620 | 30 | 18.263 | + 1.241 |
| Walthamstow U.D. Council ... | 797 | 907 | 851 | 867 | 827 | 746 | 808 | 708 | 749 | 758 | 17 | 12.726 | - 832 |
| Warrington Corporation ... ... | 467 | 468 | 453 | 506 | 415 | 444 | 482 | 544 | 423 | 433 | 17 | 7.467 | + 317 |
| West Ham Corporation ... ... | 2.755 | 2.611 | 2.679 | 2.780 | 2.603 | 2.849 | 2.885 | 2.718 | 2.854 | 2.709 | 16½ | 45.650 | + 996 |
| Wigan Corporation ... ... | 1.310 | 1.333 | 1.341 | 1.365 | 1.275 | 1.449 | 1.432 | 1.562 | 1.518 | 1.433 | 16½ | 24.275 | + 2.668 |
| Wolverhampton Corporation ... | 1.023 | 1.159 | 1.148 | 1.011 | 1.036 | 1.086 | 1.162 | 1.139 | 1.149 | 1.197 | 18 | 18.989 | + 1.016 |
| Yorkshire (West Riding) ... ... | 1.278 | 1.344 | 1.582 | 1.223 | 1.302 | 1.460 | 1.432 | 1.495 | 1.411 | 1.460 | 30 | 42.462 | + 4.547 |
| **FOREIGN TRAMWAYS.** | | | | | | | | | | | | | |
| Anglo-Argentine ... ... ... | 47.019 | 51.532 | 47.448 | 46.772 | 48.275 | 53.652 | 56.912 | 55.646 | 52.809 | 53.615 | 30 | 1.670.763 | +145.594 |
| Auckland ... ... (28 days) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Bombay ... ... ... ... | 2.854 | 2.983 | ... | ... | ... | 2.785 | 3.106 | ... | ... | ... | 27 | 84.097 | + 3.682 |
| Brazilian Street ... (month) Mlrs. | 40.854 | ... | ... | ... | ... | 48.882 | ... | ... | ... | ... | 48 | 496.129 | + 17.623 |
| Brazilian Traction... ... ... | 80.853 | 80.183 | 83.280 | 81.656 | ... | 88.987 | 93.829 | 95.712 | 95.378 | ... | 29 | 2.635.430 | +378.635 |
| Brisbane ... ... ...(month) | 21.570 | ... | ... | ... | ... | 25.013 | ... | ... | ... | ... | 26 | 151.003 | + 43.349 |
| British Columbia ... (month) $ | 498.306 | ... | ... | ... | ... | 543.186 | ... | ... | ... | ... | 52 | 6.812.309 | +1062.660 |
| Buenos Aires Port and City (month) | 5.985 | ... | ... | ... | ... | 6.249 | ... | ... | ... | ... | 26 | 39.560 | + 1.361 |
| Buenos Ayres Lacroze ...(month) | 41.518 | ... | ... | ... | ... | 44.178 | ... | ... | ... | ... | 52 | 529.780 | + 45.298 |
| Calcutta ... ... ... Rs. | 56.546 | 59.404 | 60.560 | 60.926 | 62.582 | 61.386 | 65.410 | 66.954 | 66.618 | 62.978 | 30 | 19.00.358 | + 87.931 |
| Cape Town ... ...(month) | 11.076 | ... | ... | ... | ... | 11.560 | ... | ... | ... | ... | 26 | 75.483 | + 4.640 |
| Carthagena and Herrerias (month) | 1.671 | ... | ... | ... | ... | 2.158 | ... | ... | ... | ... | 26 | 17.331 | + 6.498 |
| East India (Simplex petrol) (month) | 1.788 | ... | ... | ... | ... | 1.892 | ... | ... | ... | ... | 48 | 20.281 | + 2.750 |
| Kalgoorlie ... ...(month) | 3.351 | ... | ... | ... | ... | 2.854 | ... | ... | ... | ... | 26 | 17.226 | - 1.431 |
| La Plata ... ... ...(month) | 3.557 | ... | ... | ... | ... | 4.846 | ... | ... | ... | ... | 26 | 31.571 | + 6.822 |
| Lima ... ... ...(month) | 32.175 | ... | ... | ... | ... | 31.200 | ... | ... | ... | ... | 26 | 198.227 | + 8.110 |
| Madras ... ... ... Rs. | 22.995 | (2 weeks) | 25.218 | (2 weeks) | 25.153 | 26.556 | (2 weeks) | 28.492 | (2 weeks) | 27.430 | 30 | 3.75.087 | + 28.058 |
| Melbourne ...(month) | 57.500 | ... | ... | ... | ... | 56.500 | ... | ... | ... | ... | 26 | 380.500 | + 10.500 |
| Mexico ... (month) $ | 558.355 | ... | ... | ... | ... | 588.780 | ... | ... | ... | ... | 26 | 3.265.540 | - 5.881 |
| Montevideo ...(month) | 26.392 | ... | ... | ... | ... | 28.820 | ... | ... | ... | ... | 34 | 258.427 | + 20.005 |
| Para ... ... ... | 3.926 | 4.194 | 3.917 | 4.011 | 3.775 | 3.813 | 3.924 | 3.822 | 3.817 | 3.613 | 34 | 138.381 | + 2.906 |
| Perth (W.A.) ... ... | 1.747 | ... | ... | ... | ... | 2.024 | ... | ... | ... | ... | 26 | 53.887 | + 5.582 |
| Port Elizabeth ...(month) | 2.974 | ... | ... | ... | ... | 3.268 | ... | ... | ... | ... | 26 | 21.871 | + 6.632 |
| Shanghai ... ... $ | 20.053 | 20.843 | 20.557 | 20.690 | 19.775 | 22.400 | 22.800 | 23.200 | 23.200 | 23.200 | 29 | 605.252 | + 49.645 |
| Singapore ... ... $ | 10.288 | 10.396 | 10.504 | 70.212 | 10.044 | 11.666 | 11.509 | 12.338 | 12.454 | 12.486 | 30 | 351.283 | + 39.371 |
| Toronto ... (month) $ | 696.980 | ... | ... | ... | ... | 815.206 | ... | ... | ... | ... | 26 | 4.655.486 | +642.767 |
| Winnipeg ... (month) $ | 300.402 | ... | ... | ... | ... | 321.037 | ... | ... | ... | ... | 26 | 1.972.374 | +163.671 |
| **ELECTRIC RAILWAYS.** | | | | | | | | | | | | | |
| Central London ... ... ... | 5.044 | 4.440 | 4.146 | 4.192 | 4.008 | 5.282 | 4.777 | 4.508 | 4.528 | 4.296 | 30 | 151.352 | + 13.754 |
| City and South London ... ... | 3.139 | 3.019 | 2.841 | 2.825 | 2.778 | 2.605 | 2.950 | 2.771 | 2.818 | 2.748 | 30 | 85.270 | - 7.828 |
| Liverpool Overhead ... ... | 1.619 | 1.687 | 1.707 | 1.710 | 1.676 | 1.826 | 1.858 | 2.379 | 1.858 | 1.829 | 30 | 50.660 | + 3.926 |
| London Electric ... ... ... | 13.745 | 13.440 | 12.600 | 12.335 | 11.850 | 13.795 | 13.685 | 13.270 | 13.090 | 12.655 | 30 | 421.980 | + 5.770 |
| Mersey ... ... ... | 1.979 | 1.927 | 2.036 | 2.015 | 2.009 | 2.150 | 2.077 | 2.451 | 2.306 | 2.113 | 30 | 67.116 | + 4.604 |
| Metropolitan ... ... ... | 18.084 | 17.987 | 17.850 | 17.066 | 16.764 | 18.102 | 18.023 | 18.013 | 17.175 | 16.817 | 30 | 504.731 | + 3.447 |
| Metropolitan District ... ... | 13.489 | 13.017 | 12.422 | 12.102 | 12.022 | 13.943 | 13.520 | 13.044 | 12.734 | 12.785 | 30 | 394.739 | + 16.101 |

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# E.C.C.

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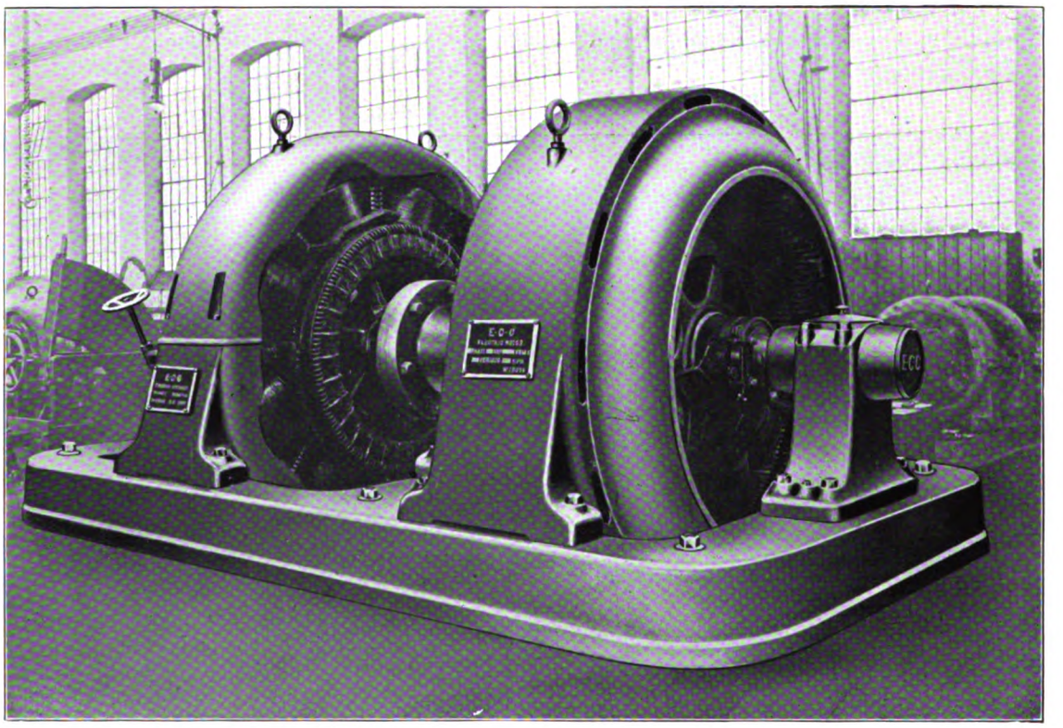
## SWITCHGEAR

OF EVERY DESCRIPTION.



600 KW. SYNCHRONOUS MOTOR-GENERATOR.

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# BERNA

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**5-Ton Lorries.**

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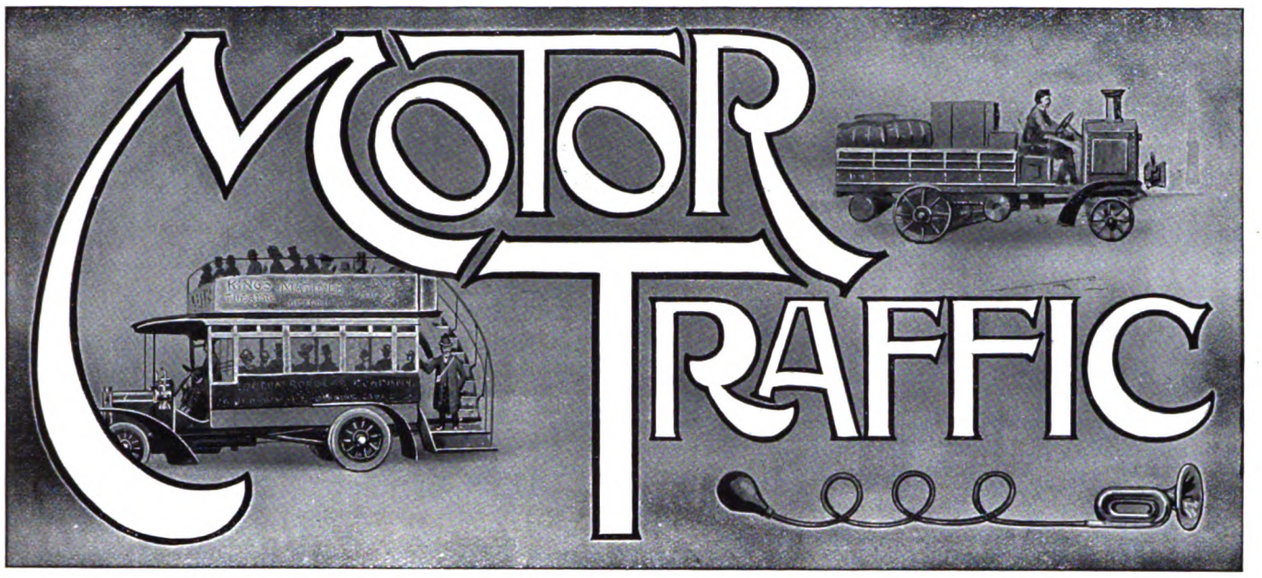


Judged from any point of view the Olympia exhibition of commercial and public passenger vehicles established a record in the annals of the industry. In the following pages we deal fully with the exhibition, its aims, and its results, and here we need only say that its success atoned for the interval of five years since the holding of the last show in London, and was a striking demonstration of the progress that this branch of automobile manufacture has made in the interval. The exhibition derived additional importance from the happy suggestion of Mr. Horace Wyatt, the editor of *Motor Traction*, which led to the holding concurrently of an Imperial Motor Transport Conference. This latter event was so widely and influentially taken up that it will rank as the premier Empire gathering yet held. Although it was organised at short notice the manufacturers responded extremely well to the opportunity it gave them to show what they are prepared to do in the provision of vehicles suited to Colonial wants. So successful did the conference prove that no surprise will be created if similar assemblies are organised at intervals of two or three years. Not the least encouraging feature of the exhibition was the manner in which British makers have retained the lead in commercial and public passenger vehicles. The stands devoted to the display of vehicles totalled 73, and of the 67 different makes exhibited not more than 19 were foreign. A feature of the exhibition was the continued rivalry between the shaft drive and the chain drive. The latter has made notable advance, an improvement here comprising a reducing worm placed between the clutch and the gear box. On live axle vehicles double-reduction gearing is being enclosed in the axle casings.

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Elsewhere in this issue will be found extracts from such of the papers submitted to the conference as have especial interest for commercial and passenger motor users, and also to manufacturers who desire to know something more of the requirements of the Colonial trade. In view of the high price of fuel, particular interest is attached to the papers on substitutes for petrol. The maintenance of a sufficient supply of fuel which does not run the risk of being cut off in time of war is vital to the existence of the nation, especially as a considerable portion of the Navy is now composed of vessels propelled by oil engines, while the numbers of this class of craft are to be greatly increased because of their greater effectiveness in keeping at sea without refueling. This circumstance alone should lead the Government at once to fall in with the resolution passed by the conference, which depends for its successful issue upon a relaxation of the excise regulations in reference to the manufacture of alcohol. A vast quantity of this can be produced from potatoes and other products in this country, thus giving a sadly required impetus to agriculture.

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It was upon the advice of Sir Boverton Redwood and Prof. V. B. Lewis that the conference decided upon alcohol as the most promising source of supply, and an encouraging fact is that these gentlemen are experts who were called upon to advise the authorities in the matter of the regulations for the storage and transport of petroleum products. Apart from providing alcoholic fuel another problem has to be solved, namely the construction of a motor suited to the use of that fuel. In this respect the United States and Germany have already made some progress. The conference resolved to appoint a committee to further the idea and to suggest ways and means. As this is a matter now under the consideration of the committee of all motor interests which met last year under the auspices of the Royal Automobile Club, a joint consultation will be advisable, especially as the Society of Motor Manufacturers and Traders have voted £2,000 as a prize for discovery of a home-made fuel in commercial quantities. It is interesting to observe that the decision in favour of alcohol was also arrived at by the far-seeing Fuels Committee of the old Motor Union in 1907, after investigation by a committee which sat for several months and collected much evidence from expert witnesses.

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All who are concerned in public passenger road traffic will be interested in the result of what appears to be the first appeal made from the King's Bench Division by a motor omnibus undertaking in regard to the use of a railway bridge. The case is the more important because of the fact that there are many railway bridges of medium strength, such as that at Cranley Gardens, which has been the cause of litigation between the Great Northern Railway Company and the London General Omnibus Company. It is situated over a short railway that runs to the Alexandra Palace from Highgate Station. The route is apparently a good one from the omnibus company's point of view, and although the company ultimately solved the difficulty by finding an alternative road, the use of the bridge by omnibuses had the effect of inducing

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# MOTOR TRAFFIC.

the railway company to strengthen the structure. In securing this result a public service was rendered, for it is not often that the organisations devoted to the protection of heavy motor vehicle and traction engine interests are able to bring about a similarly fortunate ending to their disputes with the railway companies. At the police court proceedings which were taken when the omnibus company refused to desist from using the bridge, the contention was put forward on their behalf that the regulation under which the railway company purported to act was contrary to the provisions of the Locomotives and Highways Act, 1896, and therefore was not valid and binding. Under that Act, it was urged, the control of heavy motor traffic in connection with road bridges rested entirely with the Local Government Board and with the county and county borough councils, and that the Board had no power to delegate the control to railway companies or other bodies responsible for the repair of those bridges or structures. These contentions failed to impress the magistrates, and the case went against the omnibus proprietors. When the latter took the matter to the King's Bench Division on appeal, the Divisional Court supported the magistrates' decision, and found that the regulation objected to in the Heavy Motor Car Orders was valid and binding in virtue of the powers of the Local Government Board to make regulations under section 6 of the Act of 1896 and section 12 of the Motor Car Act, 1903.

## THE MOTOR VEHICLE EXHIBITION AT OLYMPIA.

The exhibition of industrial motor vehicles organised by the Society of Motor Manufacturers and Traders was held at Olympia from July 18 to 26 and, although few novelties were to be found there, the exhibits were generally of the highest class and showed a very distinct improvement, both in design and workmanship, upon those of any previous industrial vehicle exhibition. It was not to be expected that an exhibition confined entirely to trade and public service vehicles would attract the general public, and at no time could the attendance be compared with that of the annual motor show organised by the Society in November. The number of visitors was, however, well up to the standard of industrial shows, and, moreover, these were of the class most desired by the exhibitors. The fact that the Imperial Motor Transport Conference had been arranged in conjunction with the exhibition contributed largely to the success of the latter, and assured the attendance of a large number of influential personages from all parts of the world; indeed, one of the most satisfactory features of the conference and the exhibition was the keen interest of the oversea delegates, who were drawn from practically every part of the British Empire. The distinguished visitors, who were the guests of the Society of Motor Manufacturers and Traders, included the leaders of the motor movement

General View of Motor Vehicle Exhibition at Olympia, Looking Towards the Entrance.

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## MOTOR TRAFFIC.

in this country as well as the oversea delegates to the conference, so that the gathering at Olympia on the morning of Friday, July 18, was unique in the history of the industrial motor industry.

When one recalls the years of patient endeavour which have been devoted to the production of reliable motor vehicles, it must have been gratifying to the manufacturers who were the pioneers of the industry to find not only that their efforts have been crowned with success, as shown by the rapidly-increasing demand for their output, but that their society had received Royal recognition inasmuch as a distinguished member of the Royal House attended the opening of their exhibition for the purpose of receiving the society's inspection of the public service models shown on the principal stands. The large number of Colonial visitors were amply repaid for the trouble they had taken in connection with the show, for a number of manufacturers had made a feature of Colonial models which in themselves gave evidence of careful study of the actual requirements of motor traffic in countries where well-made roads and up-to-date supply depots are the exception rather than the rule. The 75-H.P. Colonial wagon shown by Halley's Industrial Motors, Limited, is a striking demonstration of this fact.

A number of new models for the home market were shown, notable examples being those exhibited by Thos. Tilling, Limited. This old established-firm of

Motor Vehicle Exhibition at Olympia—View from the Entrance.

guests. His Royal Highness Prince Arthur of Connaught, as president of the Imperial Motor Transport Conference, after spending considerable time in examining the various exhibits, formally declared the exhibition open, and welcomed the delegates to the conference, all of whom were presented to His Highness.

A feature of special importance to the motor manufacturers was the keen interest taken in the exhibition by various municipal authorities both at home and abroad. A large number of the members of city, borough, urban, and other local authorities attended, many of them being accompanied by their chief officials; and we understand that a considerable amount of business is expected to follow their careful hiring contractors have taken advantage of the exceptional experience they have gained in the running of their large fleet of industrial motor vehicles and mail services, and they have evolved two new models which were generally accepted as being as fine specimens in design and workmanship as any exhibited at the show.

Proof of the growing popularity of motor vehicles in the cleansing departments of municipal undertakings was given in the number of exhibits which had been specially designed for the various duties pertaining to this department. These included combined watering and sweeping machines, tipping wagons for refuse and dust collection, and also for transporting road-making material, tank wagons, etc. Development was also very noticeable in fire-fighting appliances. Great progress

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# MOTOR TRAFFIC.

has been made in this section of "public service" both in the range and the efficiency of the machines shown. It is now possible for the smallest town or district to furnish its brigade with an up-to-date motor fire engine fully equipped with all the latest appliances and of a capacity suitable to its requirements, while, on the other hand, the largest and most powerful fire engine yet constructed, with a normal capacity of 850 gallons per minute, was also to be seen.

In distinct contrast to previous industrial motor exhibitions, the motor omnibus did not figure prominently, only three vehicles of the double-deck type being exhibited. Each of these, however, had features of special interest, and attracted considerable attention from the large number of tramway men who visited the show. Chars-a-bancs, or public service touring cars, as many prefer to call them, were again a feature, many very handsome vehicles of varying capacity being exhibited. The petrol-electric system of motor traction was represented by W. A. Stevens, Limited, with a number of vehicles fitted with the Tilling-Stevens combination, the efficiency and reliability of which is now so well known. During his tour of inspection, H.R.H. Prince Arthur of Connaught showed a keen interest in the petrol-electric system, and requested Mr. Stevens to arrange for him to see a touring car fitted on the Tilling-Stevens system.

The outstanding change to be noticed throughout the whole exhibition was undoubtedly the great improvements directly traceable to the introduction of high tensile steel for the manufacture of all vital parts, and the special machines and plant for the treatment of these steels on scientific lines. The use of higher grade material has enabled the manufacturers to produce much more reliable vehicles, and at the same time considerably to reduce the weight of all types. The improvements, although perhaps not very apparent to the average visitor until his attention has been called to them, have, speaking generally, had a marked effect upon the value of the latest models now available. Amongst the advantages most noticeable are, fuel economy, due to improved design and more efficient carburettors, silent running, flexibility, and accessibility. The engines of to-day are lighter, the cooling system is more perfect, while lubrication has been brought to a very high state of efficiency. Moreover, the mounting of the various parts has received considerable attention: in a number of instances we noticed flexible connections which must have a most beneficial effect upon the life of the vehicle. The large extent to which ball bearings now enter into the construction of the chassis has eliminated friction to a remarkable degree. Various methods of transmission were to be seen on the various stands, but by far the greater number of vehicles were fitted with the worm drive. In all the large axle-driven machines, the whole of the weight of the vehicle and its load is now taken by the dead axle, the driving shafts being designed for the one purpose of propelling the machine. Gear boxes also show the result of attention from the experienced designer having high-class material at his disposal; reduction in size, ease of gear change, and the introduction of ball and roller bearings are the chief features of the improved type. The chain type of gear box was also in evidence, and has now clearly demonstrated its practicability.

A feature of special importance in public service vehicles—viz., the braking power—has also received attention. Not only is the braking area increased on a number of models, but in some cases a third brake is provided, while the importance of easy adjustment has also been recognised.

Mr. Sidney Straker.

A noticeable feature of the tyre and accessory section of the exhibition was the large number of rubber manufacturers and factors who are now devoting their attention to solid rubber tyres. Some remarkable results have been obtained by several of the older firms, mileages of 30,000 and even 40,000 being by no means uncommon. In view of the fact that tyre cost has been a retarding factor in a number of cases where motor traction has been considered desirable, both on the part of municipal and private undertakings, this demonstration of the reliability of the output of the leading firms should do much to encourage the development of public motor services, and should also point to the advisability of purchase outright rather than hire on mileage contracts, as the advantage of the extra life beyond the 10,000 miles guarantee would be with the purchaser.

Taken altogether, the exhibition of 1913 has been fully justified, and as a direct result of the practical demonstration which it afforded of the great advance in the industrial motor industry that has been made during the past five years, we shall look for a large increase of users both at home and in the Colonies.

The members of the Commercial Vehicle Committee of the Society of Motor Manufacturers and Traders, who were directly responsible for the organisation of the exhibition, are to be congratulated upon the satisfactory result of their labours. The names of these gentlemen are as follow: Sidney Straker (chairman), J. H. Adams, F. Churchill, R. F. Clayton, R. Barry Cole, C. Davis, W. Dewis, H. E. Fulton, F. Garrett, G. Hoare, P. Liversidge, J. Maughling, A. E. Meadon, A. Norriss, R. J. Paton, F. W. Robson, F. Searle, A. Spurrier, and R. E. Wilson.

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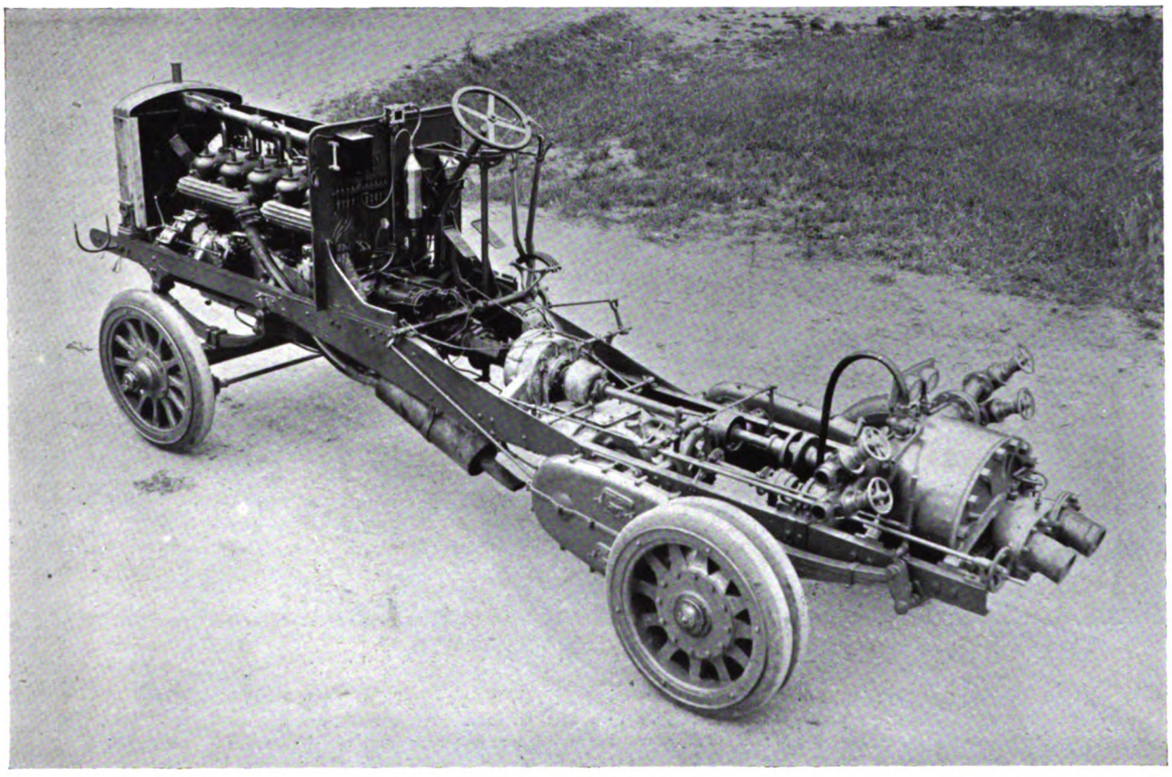
# MOTOR TRAFFIC.

## THE EXHIBITS.

**Commercial Cars, Limited.**—The most prominent exhibit on this stand was a large fire engine, the largest, we believe, yet constructed. The illustration shows the chassis stripped of the temporary body with which it was equipped for show purposes, and from this a good idea of its general proportions will be gathered. The machine, which is a repeat order from abroad, is one of a number under construction. It is to be fitted with an American type all-steel body. It has a 6-cylinder engine, developing 100 H.P. at normal speed, the cylinders being 160 mm. by 190 mm. The pump, fitted by Simonis, of Walthamstow, has a capacity of 850 gallons per minute, with two 6-inch suctions, and four 3-inch outlets. These cars have half-compression, and are also fitted with self starters. The direct drive is to the pump, the transmission to the road wheels being through the patent gear box, which is a special feature on all this company's models. The engine is fitted with two Claudel-Hobson carburettors, and is capable of driving the machine at speeds up to 50 miles per hour when fully loaded. There are several special features in the construction of this chassis. Provision is made for an extra supply of water from the pump when the machine is in operation, thus ensuring a perfect supply of cooling water under all conditions. Water is also taken for cooling the oil circulation. Amongst the other exhibits, of which there were six, the 28-seater chars-a-banc attracted the most attention; indeed we understand that definite orders were placed during the show for no fewer than five machines similar to the one exhibited. This machine was fitted with a 36-H.P. 4-cylinder engine and had a flush-sided torpedo type body. The 6-ton tipping wagon illustrated in a previous issue found considerable favour with municipal visitors, the simplicity of the tipping mechanism being much appreciated. The particular machine shown is being shipped to Canada, but a considerable number are in use in this country and giving complete satisfaction. A model of a motor horse-box was also shown on this stand and attracted considerable attention. In construction this is similar to the well-known railway type, and affords accommodation for two horses. Entrance for the horses can be effected either from the side or rear end of the vehicle, a hand winding drum being fitted for operating the flaps. There is also an entrance from the driver's seat to the horses. The whole scheme appears to have been well thought out, and the vehicles already supplied by Messrs. Commercial Cars are being used with great success.

**Coventry Chain Company, Limited,** had an exceptionally interesting exhibit of their various patterns of chains together with a number of models, which clearly demonstrated the wide field now covered by this method of power transmission. Amongst these were models illustrating the drive to cam shafts and magneto driving, as well as a heavy vehicle drive capable of transmitting 46 H.P. at 500 revolutions per minute of the driving pinion. Three chain-driven change-speed gear boxes of a new type were also shown, and as this type of gear box is now the standard of both the London General Omnibus Company and the Daimler Company for all their omnibuses, it follows that this exhibit attracted considerable attention throughout the run of the exhibition.

**Brampton Brothers, Limited,** had a tastefully arranged exhibit of sprockets and pinions. There was also a collection of roller chains in various pitches and widths, applicable to all types of commercial vehicles, and silent chains in various types, pitches, and widths, suitable for cam shaft and magneto drives, gear boxes, and drives to road wheels.



100-h.p. Fire Engine by Commercial Cars, Limited.

**The Avon India Rubber Company, Limited,** had a comprehensive display of the various tyres for which they are famous. In addition to the well-known sections they also showed a number of new sections and sizes which they are introducing as the B tyre, from which excellent results are expected. An interesting feature was the display of tyres taken from service for exhibition purposes after having run well over their guarantee. One set, taken from an Albion van after running 22,400 miles, was by no means worn out, and we understand it will be returned for further service. A feature of interest on this stand was the Coleman patent triple non-skid tyre. This is made up with two hard and one soft rubber sections, the soft one being in the middle and made to stand up about half an inch above the level of the two outer rings. A tyre which had run some thousands of miles on a National Steam Company's omnibus was also shown.

**J. W. and T. Connolly, Limited,** in addition to a large range of solid tyres, also displayed a number of wheels made on the "airless" principle.

**Gaulois Tyres (1909) Limited.**—This firm attracted considerable attention by displaying on their stand a number of Bergougnan solid tyres, together with the announcement that out of a total entry of 98 vehicles for the French military trials, 76 were fitted with these tyres.

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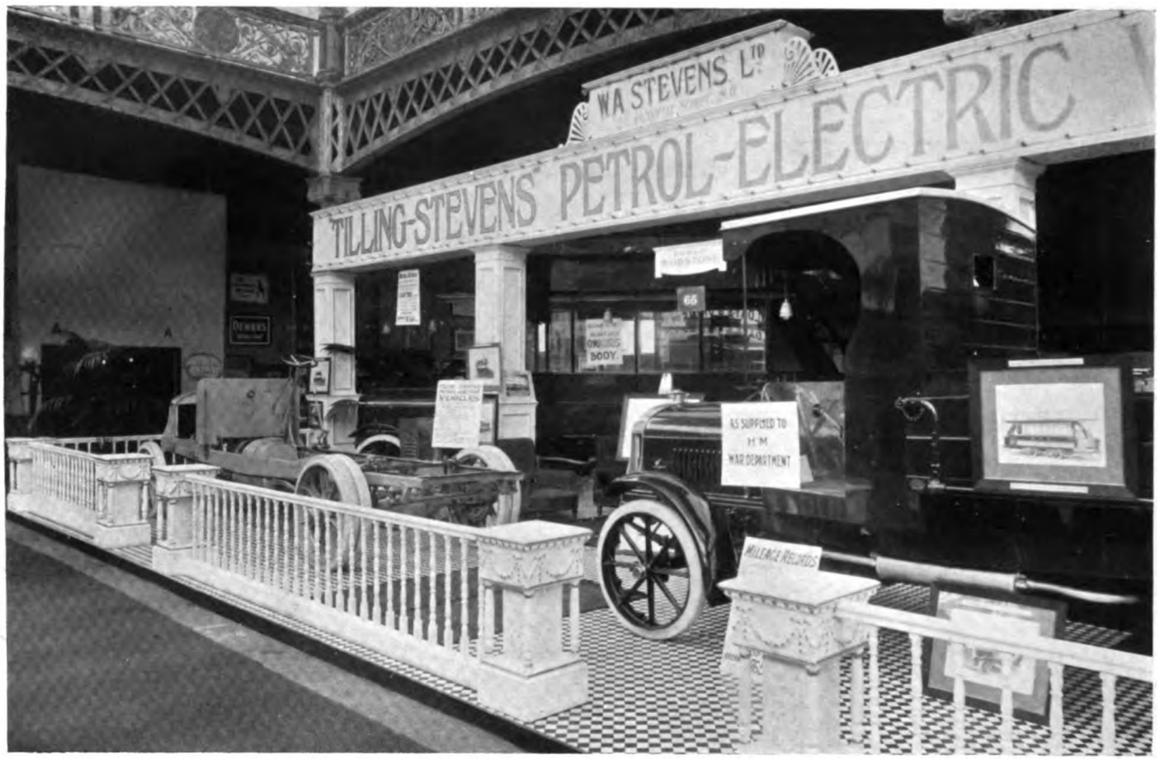
# MOTOR TRAFFIC.

**W. A. Stevens, Limited,** showed four examples of the Tilling-Stevens petrol-electric system. Whether by reason of the comparative novelty of the combination, or by reason of the excellent results obtained by Thomas Tilling, Limited, in the running of their large fleet of London 'buses, all of which are now fitted on this system, there can be no two opinions as to the keen interest in this exhibit shown by the majority of the visitors. Throughout the entire run of the exhibition the staff of salesmen had difficulty in interviewing all those who were interested, and we understand that the number of inquiries received from potential users was very large, and included both municipal and private interests. Each of the examples shown was of the 40-H.P. model, which is doing such good work in Birmingham, Liverpool, Newcastle, etc. The exhibits included a bare chassis, a double-deck omnibus, a torpedo public touring car, and a 4-ton lorry.

**White and Poppe, Limited.**—This firm's reputation has been built up in specialising for the most important of all the parts of the motor vehicle—the internal combustion engine. No better testimony to the merits of the White and Poppe engines can be desired than to know that they are also advantageously used for re-engining a car. In addition to an exquisitely-made range of petrol engines, the stand contained engines equipped for the use of paraffin and an extensive selection of carburettors suitable for all types of commercial vehicle engines.

**Argylls, Limited,** had an extensive and representative exhibit of the well-known models produced at their factory north of the Clyde. These included a 15-H.P. taxi cab, a 15-cwt. delivery van on a similar chassis, a 1-ton delivery van, and a 2-ton chassis fitted with a 20-H.P. engine.




**General View of the Stand of W. A. Stevens, Limited.**

The double-deck omnibus, which is particularly suited for provincial work, is capable of accommodating 40 passengers in addition to the driver, and is similar to that designed by Mr. Ellison, general manager of the Eastbourne Corporation motor department. Special attention has been paid to the comfort of the passengers, both in regard to the arrangement and furnishing of the seats, and the space between them. The body was built by J. Liversidge and Son, and is an excellent example of the coach builder's art. The bare chassis afforded an opportunity for the close inspection of the petrol-electric combination, which has already been fully described in these pages. Briefly, the system as shown consists of a 40-H.P. petrol engine placed in the usual position under a bonnet with a direct drive to a shunt-wound generator: this is carried, together with the motor, upon a special frame built into the main chassis frame. The series-wound motor is permanently connected to the generator and drives a universally jointed propeller shaft, the final drive being by means of a live axle fitted with an over-drive worm gear. The speed of the vehicle is regulated by means of resistances operated by a lever placed on the steering column, a reversing switch being also provided. The system is one that has now been thoroughly well tried, and has proved itself to be both reliable and efficient. An item that attracted considerable attention was the display of two large charts. These showed the transmission strains as they were recorded by the accelerometer on a gear-driven omnibus and a Tilling-Stevens omnibus under identical conditions, and are of special interest, as they clearly illustrate the regularity of the acceleration made possible by the electric drive.

**E. G. Wrigley and Company, Limited,** had some very fine examples of their high-class gear and worm wheels displayed on their stand. An exhibit which attracted considerable attention was a complete rear axle for a 2-ton chassis. This was worm-driven, and fitted with a single-brake drum on each wheel, on which act external contracting and internal expanding brake shoes. The gear and countershaft for a chain-driven vehicle were also shown, and a spring-driven self-starter, which is quite a new idea, found many friends.

**Stern-Sonneborn Oil Company, Limited.**—A complete range of the "Sternol" lubricants was shown. A considerable amount of attention was attracted by running a gear box filled with a special gear lubricant known as "Ambroleum." This clearly demonstrated the fact that the lubricant clings to the teeth of the gears, and renders the gear box perfectly silent, besides perfectly lubricating the pinions.

**Liga Tyres, Limited,** had a display of continuous-band tyres of various sizes and suitable for all commercial purposes. A section of a standard tyre was also exhibited for the purpose of showing the construction and method of building up the tyre. A ball of pure Para rubber and sheets of plantation rubber, some smoked and some in its natural state, added considerably to the interest of the exhibit.

**R. W. Coan,** of Goswell Road, the aluminum casting specialist, had some exceptionally fine castings on show at his stand. This included cleverly designed gear boxes, crank cases, and other parts of the modern chassis which have done much to reduce weight and improve appearance. A 6-cylinder crank case displayed at the back of the stand was an exceptionally fine piece of work.

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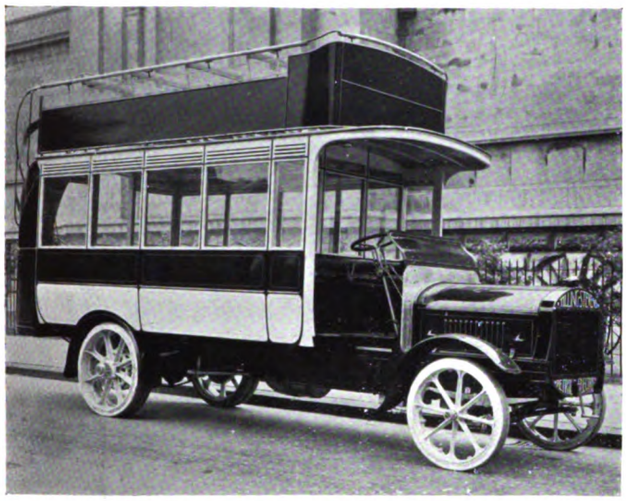
# MOTOR TRAFFIC.

**S. Wolf and Company, Limited,** of "Solex" fame, had a stand full of interesting things, including electrically-driven drills, magnetos, sparking plugs, pumps, horns, tyre levers, etc. By far the most important part of their exhibit was the "Solex" specialities, the carburettor and radiator, both of which have been described in these pages. The success of the radiator as now applied to the Tilling-Stevens omnibuses in London has been most marked, and we understand that it is the intention of Thomas Tilling to adopt this as the standard for their omnibus fleet.



Tilling-Stevens Petrol-Electric Omnibus.

Interior of Tilling-Stevens Omnibus.

**Alldays and Onions, Limited,** staged no fewer than seven different models, the two extremes being a 5-ton chassis fitted with a 30-40-H.P. engine and a 5-cwt. delivery van fitted with an 8-H.P. engine.

**Sidney Straker and Squire, Limited.**—This well-arranged exhibit included six machines, four finished vehicles and two bare chassis. The complete vehicles included a 21-H.P. private station omnibus, a light box van on a similar chassis, a 3-ton box van, and a 3-ton sheet van with detachable sides, each on chassis fitted with 28-40-H.P. engines and a large pantechnicon van on a specially constructed chassis also fitted with the 28-40-H.P. engine. The two bare chassis shown were the two models fitted to the complete vehicles, viz.; the 21-H.P. 30-cwt. type, and the 28-40 type with a carrying capacity up to four tons. In the larger model the cylinders are cast in pairs, 4½ in. bore and 5 in. stroke, while in the smaller machine they are cast *en bloc*, 90 mm. by 120 mm. Both of these chassis have worm-driven live axles, and the general construction is on similar lines, the cardan shafts being fitted with double universal joints. In the larger model a four-speed chain-driven gear box is fitted, but the smaller machine has an ordinary three-speed box. The load bearing axles in both cases are of the solid forging type with the worm gearing and differential carried in a strong sheet casing on the top. In the larger machine the braking arrangement is somewhat different, as in addition to the brake arranged to act upon the back wheels, the foot brake takes effect through contracting shoes on a metal brake drum fitted just behind the gear box. Throughout the whole run of the show the time and attention of the sales staff on this stand was fully occupied, and Messrs. Straker and Squire must be well pleased with the interest created by their latest models. We understand that in addition to the very large number of inquiries received and the refusal of orders on account of price or unreasonable delivery, no less than 13 actual orders were booked at the exhibition.

3-Ton Straker Van.

**Pedrail Transport, Limited,** had an exhibit which attracted much attention. In their latest adaptation of the "Pedrail" system, the machine has undergone a complete transformation since it was last before the public some years ago. Instead of the hinged feet fitted to a wheel, the feet are now carried on an endless chain working over two axles placed a sufficient distance apart so that two or three feet are always on the ground at the same time. The feet approach the ground with their faces in a horizontal position, and it is claimed as an advantage of the system that there is no slip or suction effect upon the road. The machine exhibited is intended to be worked with a trailer, and the steering is carried out by using the trailer in the form of a rudder, this being operated with worm gearing controlled by a hand wheel from the driver's seat. The two vehicles are connected together by means of a vertical pin joint situated midway between them. The strong point advanced in favour of the pedrail is the fact that with a 10-ton vehicle the average weight on the ground when fully loaded is only 14 lb. per square in., so that with this system mechanical transport is made possible over soft ground which otherwise would be impossible.

**The Wolseley Tool and Motor Car Company, Limited,** included in their exhibit five specimens of the new models now being constructed at their works. These ranged from a light delivery van, with a carrying capacity of 12 cwts. and fittted with a 12-16-H.P. engine to a 3½-ton chassis fitted with a 35-H.P. engine, designed to meet the requirements of the War Office subsidy scheme for class 4 vehicles. The engine is of the 4-cylinder type, with automatic lubrication and water circulation by pump. The bevel-driven back axle is of the double-reduction type, while the gear box gives four speeds forward and a reverse.



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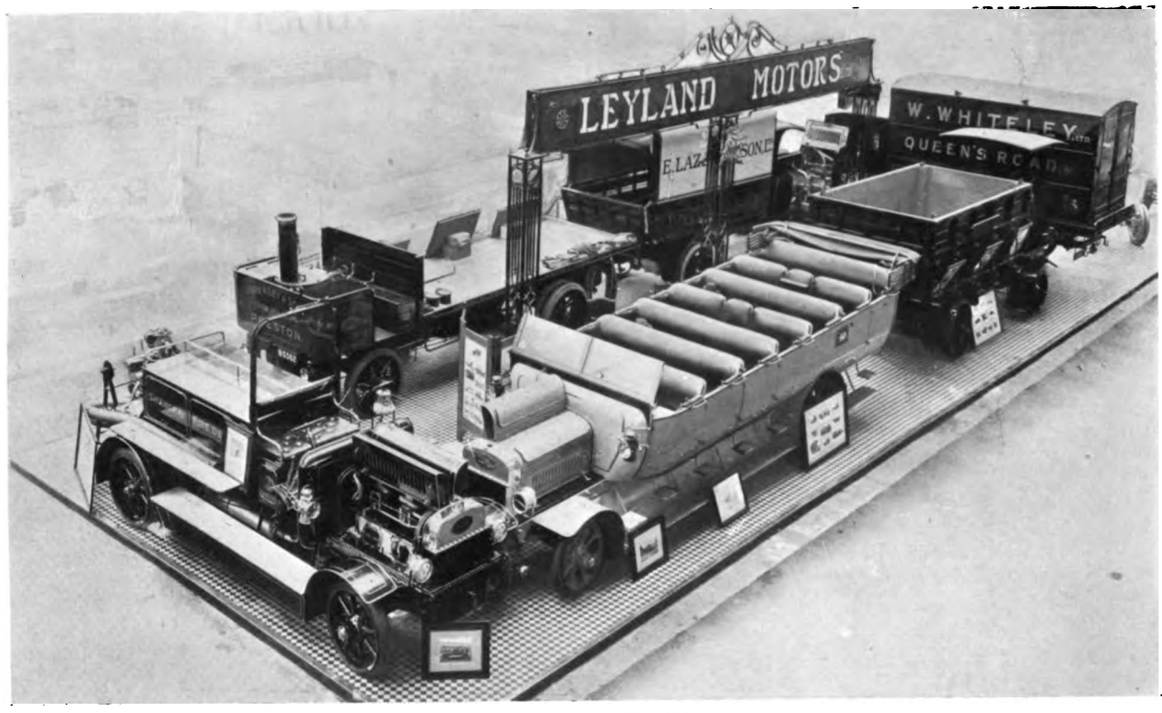
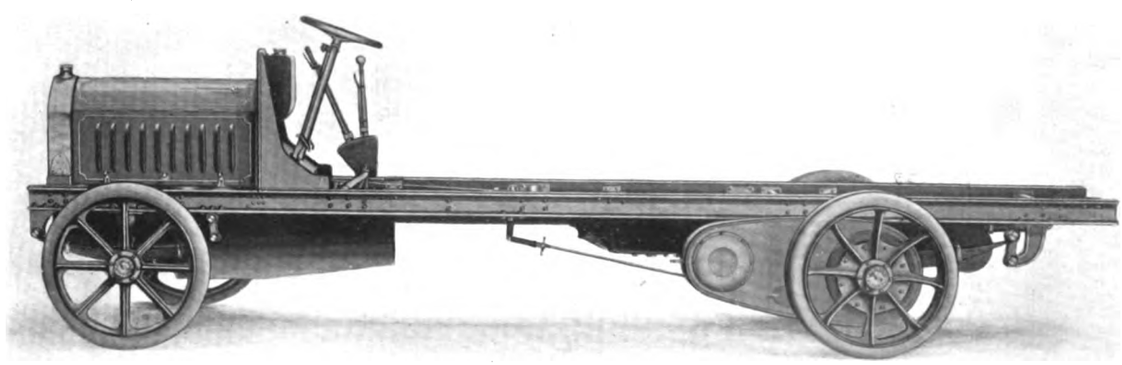
# MOTOR TRAFFIC.

**Leyland Motors, Limited.**—One of the most notable displays was to be seen here with five petrol and one steam vehicle. Prominent among the former was a 3-ton lorry chassis, fitted with a sling furniture removal body, to the order of Whiteleys. It had gained the War Office subsidy of £110, had a 30-H.P. engine, and a gear-driven live axle. Other petrol exhibits comprised a 40-H.P. 4-ton van, with standard gear-driven live axle, and 4-speed gear box. A torpedo char-a-banc, fitted with Cape hood and wind screen, had a 40-H.P. engine. The latter exhibit was universally admired; its price was £1,018. It seats 32 passengers. Bombay Corporation had purchased the 4-ton municipal tip wagon, of 40-H.P., fitted with refuse body, interchangeable with a tank body, suitable for holding 1,000 gallons of water for street watering. Another splendid exhibit was the 55 H.P. fire engine, fitted with a Rees-Roturbo 4-stage turbine pump, delivering 450 gallons per minute. This was listed at £1,050. The steam exhibit was a 35-H.P. 6-ton wagon with lorry platform, capable of pulling a trailer loaded with four tons. The boiler gives 250 lb. steam pressure with superheated coil. At £560 this was the cheapest vehicle on the stand. Upon the restricted limits at Olympia it was not possible to give an adequate idea of the wide range of uses to which the Leyland products are put. The company cater for every industry and trade, and they also have a world-wide reputation as makers of petrol railway and tramway cars. Their public passenger vehicles range from the smooth-running double deck 'buses of the Central Company in London and those of the London and North Western Railway Company, to single-deck vehicles employed by companies in all parts of the kingdom, and also abroad. To appreciate fully the scope of the Leyland Company's activities, a copy of their latest catalogue should be applied for. This is one of the finest catalogues yet published in connection with the motor industry.




**The Leyland Exhibit.**

**Albion Motor Car Company, Limited.**—This exhibit included two bare chassis and four complete vehicles These were a 32-H.P. 3-ton chassis, a 25-H.P. 2-ton chassis, a 32-H.P. 4-ton lorry, a 32-H.P. 29-seater torpedo char-a-banc, a 25-cwt. box van, and a 15-cwt. box van. Of the two chassis the 25-H.P. machine, which is an addition to the Albion models, attracted by far the greater attention. As will be seen by the accompanying illustration, this machine does not conform to the War Office subsidy specification, inasmuch as it is chain driven, although we understand that at one time it was intended to design this model for that purpose. The engine is of the 4-cylinder type, cast in pairs,



**2-Ton Albion Chassis.**

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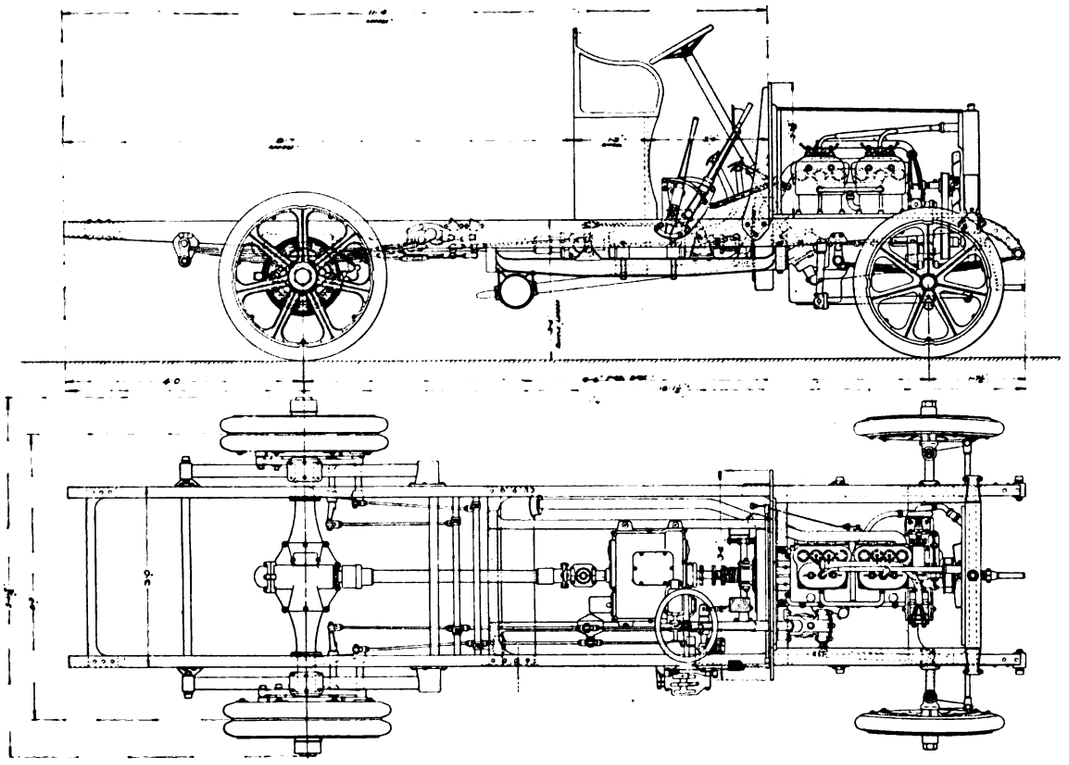
# MOTOR TRAFFIC.

102 mm. by 140 mm., giving 25 H.P. at normal speed. The Albion patent combined pump and fan insures an efficient cooling system in conjunction with a radiator of the flattened tube type. The valves are all arranged on one side, and are mechanically operated. A small gear-driven pump supplies oil under pressure to each of the main bearings, the valve gear being lubricated by the splash. The engine is governed on the inlet by the Murray patent governor fitted to the front end of the crank shaft; this effectually prevents the engine speed exceeding 1,050 revolutions even when the engine is running light. The char-a-banc shown was fitted with glass wind screen and an expanding hood, with side storm curtains, the whole being most tastefully finished. The chassis was the Albion standard 32-H.P. model, the gear box giving three speeds and reverse, with side chains for the final drive.

**Thos. Tilling, Limited.**—This old-established firm of motor hiring contractors and pioneers of the public service motor omnibus in London, have now entered the field as manufacturers, and have placed



**Tilling's 2-Ton Model Chassis.**

on the market two models entirely of their own design. It was not the original intention of Messrs. Tillings to manufacture these machines for sale, but merely to supply their own needs in running the mail and other hiring contracts for which they had become so well known. They have, however, been induced to do so by the large number of inquiries which they have had from intending purchasers of motor vehicles who have observed the successful running of the Tilling machines, and they have now made arrangements to sell or let on hire either type of vehicle, both of which were exhibited at Olympia. The two models have a number of features in common, and have been evolved from the practical experience gained in the running and maintenance of their own large fleet. Strength, neatness, and accessibility are the points that must appeal to those interested in the running of motor vehicles, and these are the three points that stand out boldly in the design of both these new machines. The 2-ton model, a drawing of the elevation and plan of which are here reproduced, has a well-designed 4-cylinder engine, developing 20 H.P. at normal speed. The cylinders are cast in pairs, 90 mm. bore, by 120 mm. stroke, with large interchangeable valves with adjustable tappets. The crank shaft is of the finest chrome nickel steel, running in three long white metal-lined bearings of large diameter. "Solex" automatic carburettor is fitted, and high-tension magneto ignition. The cooling system is by centrifugal pump, and the "Megevet" radiator is supported on special brackets to eliminate any straining action. Lubrication is by geared pump to troughs under the big ends and troughs over crank shaft main bearings. The transmission is effected by leather-faced cone clutch to gear box, thence by propeller shaft, having a universal joint at each end, to the worm-driven rear axle. The gear box gives four speeds and a reverse, with positive interlocking of all gears. The change is on the gate principle. Two powerful brakes are fitted, acting on separate drums on the rear wheels, the hand brake being of the external contracting type, and the pedal brake internal expanding. The back axle is made up of a cast-steel casing, reinforced by a chrome nickel-steel tube, machined from the solid bar, the front axle being a chrome nickel-steel stamping. In the case of the 1-ton chassis the engine has cylinders 80 mm. by 120 mm., and the gear box only gives three speeds and a reverse, otherwise there is a very great similarity between the two machines, although the weight of material in the heavier type is naturally in accordance with the load the vehicle is designed to carry. The finished vehicles shown on the stand were each mounted upon chassis of the new type, and gave visitors an excellent idea of the possibilities of each machine.

**Dennis Brothers, Limited.**—A good idea of the varied uses of the products of the extensive Guildford Works was given by the eight chassis—some fitted with bodies—shown at their stand. The most striking vehicle was an 18-H.P. double-bedded ambulance fitted with the latest design of stretcher, built to the order of the Metropolitan Asylums Board, at £500. Sixty-three of the same kind have now been supplied to the Board, which altogether has 100 motor ambulances in service. The company has just received an order from the Grand Duke Michael to supply a presentation ambulance to the Hampstead and North-West London Hospital. The bodies as well as the chassis are constructed in the company's works. Fire engines, for which Dennis Brothers are leading makers for the municipalities and private brigades, were represented by machines of 60, 45, and 30 H.P., with turbine motors, the capacity ranging from 400 to 150 gallons. The first and second models were built to the order of the London Fire Brigade and Basingstoke Council. The 30-H.P. specimen is an entirely new one, suitable for country districts and small brigades. An interesting exhibit was a 3-ton chassis which satisfies the War Office subsidy requirements. This is the only worm-driven type the War Office have sanctioned. A 2-ton char-a-banc of 35 H.P. was remarkable for its luxurious body. This and other machines of less

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# MOTOR TRAFFIC.

horse-power can be fitted with single-deck omnibus bodies. A tilt van for furniture conveyance had two tons capacity, the engine being of 28 H.P. A notable exhibit was a 5-ton lorry of 40 H.P., four speeds, steel

Stand of Dennis Brothers, Limited.

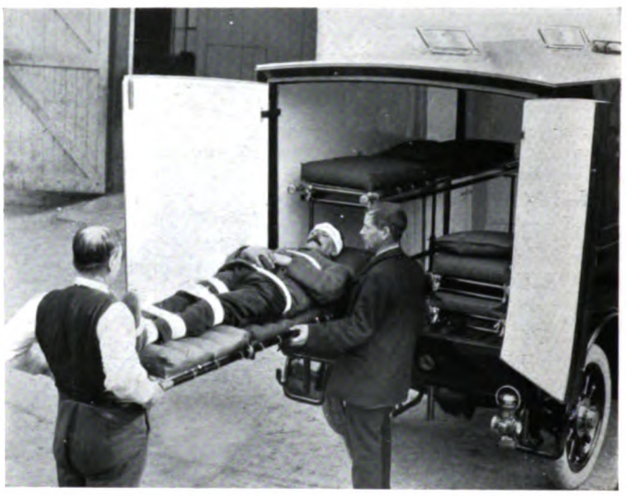
wheels, and a paraffin carburettor in conjunction with an independent petrol system.

**Austin Motor Company, Limited,** showed three models, 2½-ton lorry, 15-H.P. motor ambulance, and a 15-H.P. light delivery van. The first-named is the new low loading platform type with the lattice girder frame which has already been described in these pages. This attracted a considerable amount of attention on account of its radical departure from the usual practice in methods of construction, notably, the provision of two springs on each side of the rear axle, and the fact that each wheel is independently driven by means of a universally-jointed propeller shaft, at the end of which is mounted an enclosed

Austin Ambulance.

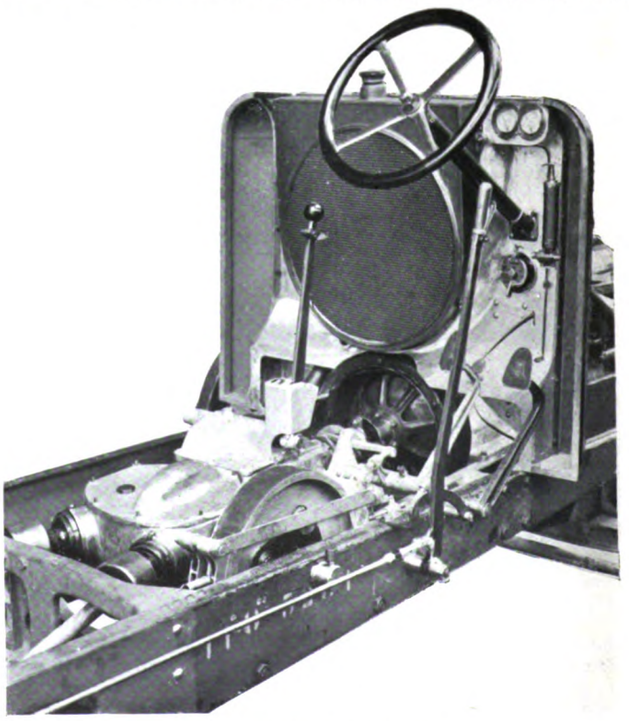
bevel gear acting on the wheel direct. The Austin ambulance is mounted on a 15-H.P. 4-cylinder chassis, and is specially designed for the painless transport of patients. It has a scientific equipment, with first-aid cabinet, and is arranged for loading four stretchers which can be elevated or lowered from the outside. The particular vehicle exhibited was built to the order of the Bolton Corporation, and we understand that similar machines have been supplied to the Metropolitan Asylums Board and the health departments of Manchester and Birmingham.

**Halley's Industrial Motors, Limited.**—Three of the five petrol vehicles shown were made for Colonial use. An encouraging sign of the ground which British makers have gained in this direction is that the Halley Company have found it necessary to issue a handbook of working instructions relating to their Colonial models. One of these, of 75 H.P., was the most prominent feature in the whole exhibition on account of its high clearance from the ground and the fact that the front axle has a pivoted form of construction enabling the axle and the wheel to surmount obstructions without interfering with the horizontal position of the chassis. The chassis carries eight tons; other features were four-speed gear box and epi-cyclic transmission gear, all enclosed in oil-tight and dust-proof chain cases. A special gear enables the vehicle to extricate itself from soft ground, etc. £1,200 was the price of this machine, which can be run on petrol or paraffin. Two of the other three exhibits possessed a Colonial feature. A 25-H.P. 30-cwt. chassis had the Colonial type engine with valves all enclosed, thermo-syphon cooling and 3-speed gear box with final drive by roller chains, enclosed in oil-tight and dust-proof cases, to the road wheels. To another 3½-ton chassis there was a 35-H.P. Colonial engine, with Colonial canopy over the driver, and specially large road wheels. A



Austin Ambulance in Use.

40-H.P. 5-ton chassis, fitted with box van body, had 4-speed gear box and final drive to the rear wheels by roller chains enclosed in Halley dust-proof and oil-tight chain cases. A feature of all Halley models is the fool-proof gear box, and the Colonial machines have the added



View of Austin Chassis.

advantage of the differential gear being cut out of action at will, thus preventing one wheel slipping when endeavouring to drive on soft ground.

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# MOTOR TRAFFIC.

**David Brown and Sons (Huddersfield), Limited.**—This stand was devoted to the products of a firm who are specialists in worm-driven axles, steering boxes, and worm speed-reducing gear. Models which demonstrated the working of these inventions were also shown. All the exhibits were for use with commercial vehicles, both light and heavy, and including omnibuses and lorries. It is claimed that experience of the worm drive shows it to be the simplest for heavy vehicles, that it gives absolute quietness even when worn, increased strength and reliability, and a large range of reduction ratios in an axle casing of moderate dimensions.

**Belsize Motors, Limited.**—The exhibit of this firm embraced practically every branch of the commercial vehicle trade, from the 10-12-H.P. 5-cwt. van which sells complete, with lamps and horn, at £220, to the latest design 4-ton chassis at £650 with tyres. The 10-12-H.P. chassis has become deservedly popular among tradespeople and business houses all over the country, and is certainly one of the cheapest and most economical business cars made. The 4-cylinder engine, with the unique construction of clutch and gear box in one unit, has proved most successful with this van body, and these vans cost very little more to run than many of the three-wheeled runabouts which are on the market. They have been well taken up in London, and are being used extensively by the London *Evening News*, the *Daily Sketch*, etc. These firms are also owners of large fleets of the well-known 15-cwt. van which is fitted with a 14-16-H.P. engine, the *Evening News* alone running over 25 vans of this model. The 15-cwt. chassis has proved its reliability in all circumstances and in many countries. This has always been one of the most successful products of the firm. It sells at £310 for a chassis, and £360 complete with box-van body. The 30-cwt., 3-ton, and 4-ton chassis are models which are being seen in the South of England practically for the first time owing to demands in the North. They are all of the very latest design, and embody many improvements and ideas suggested by the many years' experience which the Belsize Company have had in manufacturing motors. They have made a great reputation for themselves in mail services and other heavy work in the Midlands and North. In addition, there was shown a greatly-improved model of the 14-16-H.P. cab of which several thousands are in use. This type is now fitted with four speeds forward, new lubrication system, 815 mm. by 105 mm. tyres, and new Sthenos carburettor, by means of which the petrol consumption has been greatly improved. The coach work also compares very favourably with the most luxurious types now being used in the London streets.

Belsize Light Delivery Van.

**De Dion Bouton (1907) Limited.**—This firm's exhibit comprised five types of vehicles ranging from a 40-H.P. double-deck omnibus down to an 8-H.P. light delivery van. The principal feature of the new De Dion Bouton omnibus is that it is of the "over" type, the driver's seat being placed over the engine, thus greatly economising the overall length. The 'bus is fitted with the "plate" clutch and the De Dion type of back axle, both of which features have been pronounced successes and greatly helped in the splendid results obtained by the London General Omnibus Company in the running their De Dion fleet. In this connection it is worthy of note that the London General Omnibus Company ordered 98 De Dion omnibuses in 1905, and that the Vanguard Company ordered a like number shortly afterwards, the latter, of course, being taken over by the London General Omnibus Company upon the absorption of the Vanguard Company. Of these vehicles, 115 are still in the daily service of the London General Omnibus Company, whilst those taken out of service in London are rendering good service in the provinces, a particular instance of this being the 16 now in regular service for the Eastbourne Corporation. Another interesting exhibit was a street cleaning machine built to the order of a Brazilian municipal authority. This was fitted up as a combined sweeping machine and watering wagon, and has an 18-H.P. 4-cylinder engine 90 mm. by 120 mm. This not only drives the car at a maximum speed of nine miles per hour, but also pumps the water to and from the reservoir, which has a capacity of 570 gallons. The pump is of the rotary type, and is driven from the differential. The water is discharged from the front of the machine, each nozzle is capable of covering a space of 45 ft., so that by using both nozzles a 90 ft. road can be watered at one operation. The power-driven rotary brush is placed under the centre of the chassis in a dust-collecting casing, and is driven by a flexible shaft. The brush can be removed when the machine is required only for watering purposes. There was also shown a 3½-ton chassis built to the requirements of the French War Office. This was fitted with a 4-cylinder engine, the cylinders being 100 mm. by 140 mm. Each of these machines were fitted with the "Solex" radiator, which appears to have become the standard for all the De Dion Bouton heavy types.

De Dion Omnibus.

Durham Churchill 5-Ton Lorry.

Berna 5-Ton Lorry.

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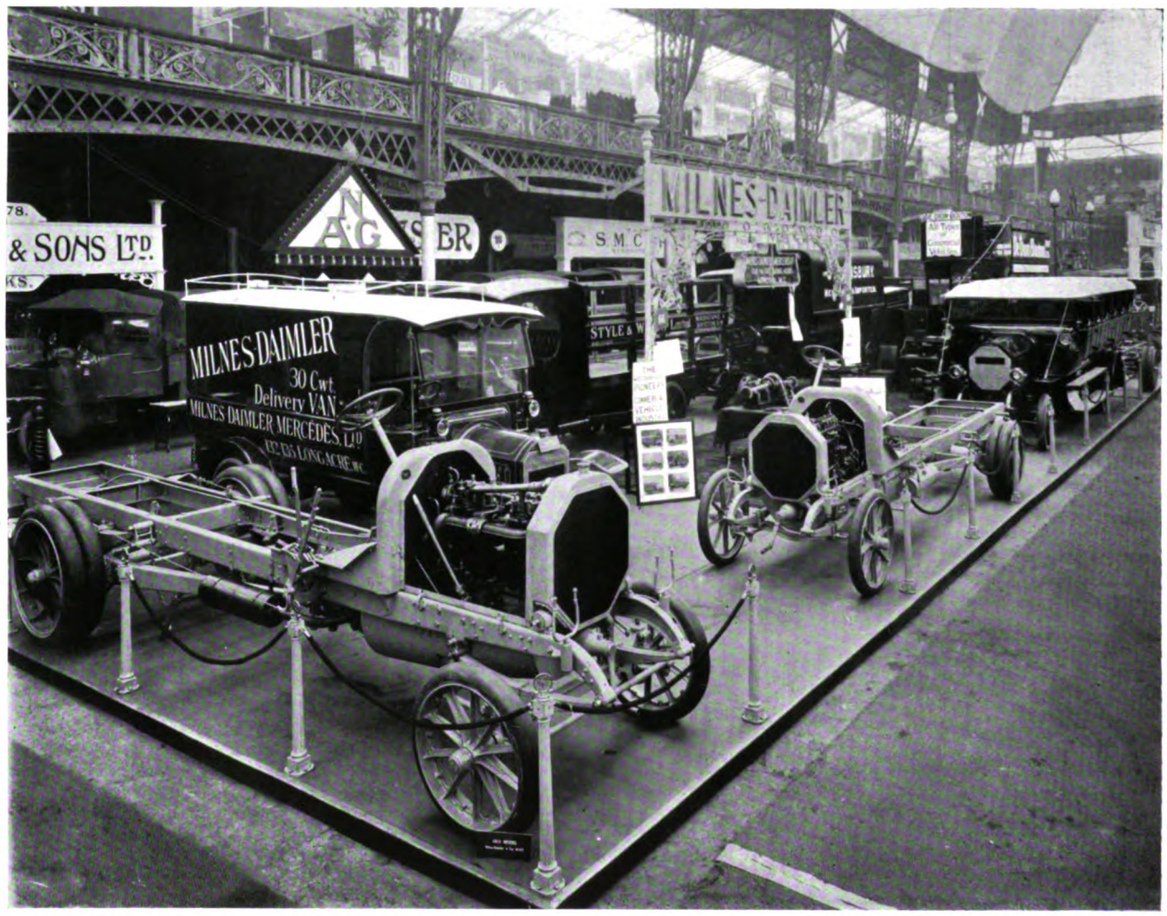
# MOTOR TRAFFIC.

**Berna Commercial Motors, Limited,** showed three of their 5-ton models, two fitted with open wagon bodies, and one bare chassis. The splendid record of this famous Swiss-built machine has evidently impressed a large number of people in its favour, judging by the attention that was paid to this stand throughout the run of the show. The special features of this machine is the great strength of all its component parts, and also its simplicity. When one remembers the fact that before being passed out of the factory each machine is thoroughly tested with an overload on the mountainous roads of Switzerland, it is not surprising to find them doing such good work in this country. Much attention was attracted by a wheel and pinion taken out of service after having run some 50,000 miles. The record goes far to prove the durability of the material used in the construction of this important detail.

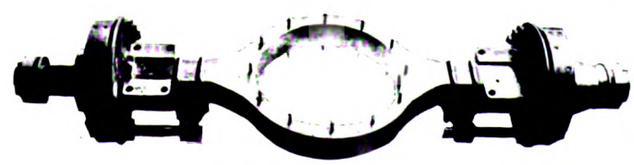
**Milnes-Daimler-Mercedes, Limited,** had an excellent display of their various models ranging from 45-H.P. 6-ton chassis to a 30-cwt. 20-H.P. delivery van. The two latest types of Milnes-Daimler chassis, viz., the 45-H.P. 6-ton and the 3-ton chassis deservedly attracted a considerable amount of attention. In the larger model the rack and pinion drive which has always been associated with the earlier Milnes-Daimler machines is retained, but in the 3-ton vehicle this has been replaced by a bevel-driven live axle. A feature in the design of both these models is the use of strong channel section perch bars, which are carried forward from the back axle to a point level with the universal joint immediately behind the gear box, thus forming combined radius and torque members. Accessibility to all wearing parts is made a strong feature in the design of these new types. A very handsome char-a-banc, mounted on a 35-H.P. engine, was a noticeable feature of this exhibit, as was the set of differential bevels displayed on the stand. These had been taken from a 5-ton van owned by James Nelson and Sons, which had been supplied to them in February, 1903, the vehicle having travelled a distance of 110,000 miles without any replacement of the transmission gear. The condition of the parts after this extraordinary service speaks well for the quality of the material used and also the accurate workmanship. In each of the models the engines are of the 4-cylinder type, cast in pairs, the valves being all of the overhead type. There is forced lubrication to all working parts.

**The Maudslay Motor Company, Limited,** showed three motor vehicles, two closed vans and a char-a-banc, besides three chassis. The char-a-banc is of the "Harrogate" pattern to seat 28; they are made to seat from 14 to 33 passengers, and cost with all extras (including doors on both sides) from £140 to £300, according to size and upholstering. The chassis of which we give illustrations is similar in general design to those under the closed van, and also to a number supplied to the Great North of Scotland and the Great Western Railways. The side members of the frame are rolled steel channels built up with steel tubular cross members. The whole frame is bolted together, no rivets being employed. The engine is of the standard Maudslay patented design of 40 H.P. on the R.A.C. rating.




**The Milnes-Daimler Exhibit.**

A leather to metal cone clutch is provided with Maudslay patent oil retaining plate; four speeds and a reverse are available. The drive in the back axle is in two stages, the first reduction is made by a pair of bevel pinions and the second by means of a pair of spur pinions. The whole



**Maudslay Back Axle.**

gear box is removed without trouble from the steel axle, and the box itself is easily taken apart, once it is removed from the axle. The back axle itself is of Maudslay patent weldless steel. The hand brake acts

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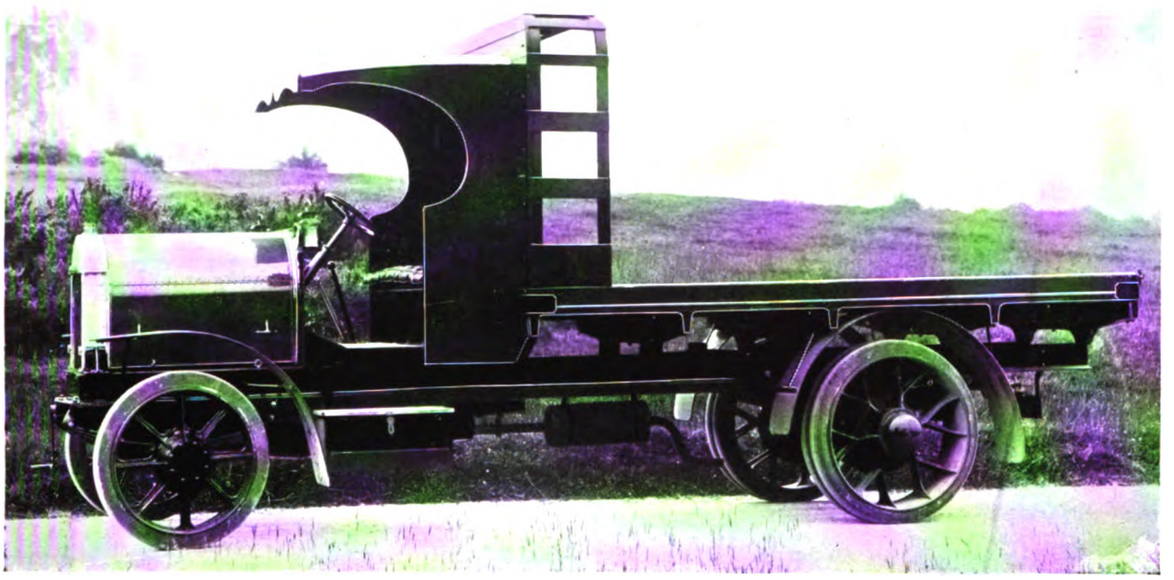
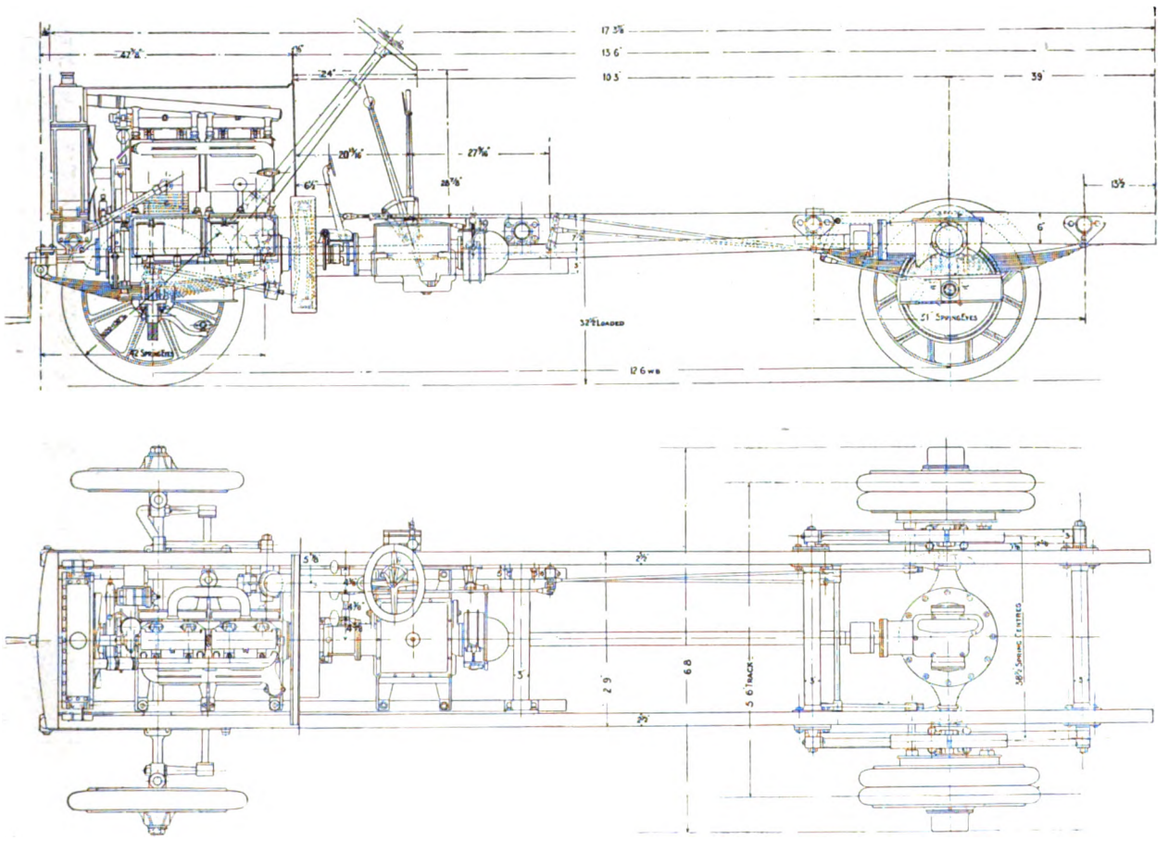
# MOTOR TRAFFIC.



5-Ton Maudslay Lorry.



Plan and Elevation of Maudslay 5-Ton Chassis.

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# MOTOR TRAFFIC.

through compensating levers on brake drums on the rear wheels. These are of the expanding type, and are completely protected from mud or dust. The front brake acts on a drum on the propeller shaft. Both brakes are easily adjusted and of ample power. The transmission is by propeller shaft, with universal joints at both ends and bevel-driven live axle. The 28-seated char-a-banc shown was mounted on a standard 3-ton chassis. This has a very luxurious torpedo type body, upholstered in real leather, and fitted with Cape cart hood and wind screen. The 30-cwt. box van, is a very suitable machine for carrying either perishable goods, or goods that might be damaged by dust or weather. It is coach-built throughout, and is mounted on a Maudslay standard 30-cwt. chassis. The 3-ton covered van is one of 12 supplied to Messrs. Lever Bros. Limited, of Port Sunlight, for distributing their goods to various parts of the country. Both the body and chassis have been specially built for heavy goods which will not stand exposure to weather.

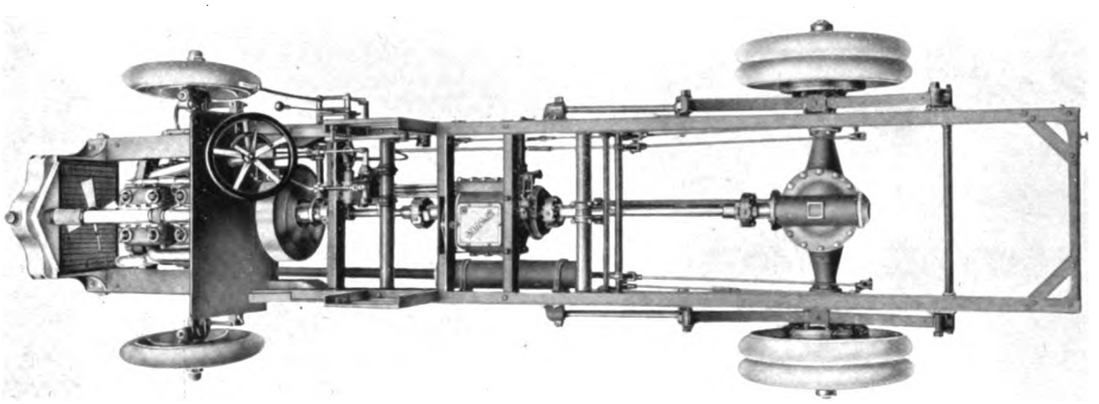
**McCurd Lorry Manufacturing Company, Limited.** The exhibit on this stand comprised a complete 40-H.P. chassis together with a separate engine, and all the vital parts of a chassis dismantled for the purpose of thoroughly demonstrating the exceptional care that has been taken by the designer to eliminate all possible cause of trouble in running and maintaining the machine in service. The exhibit attracted considerable attention not only from the visitors but from the motor manufacturers, a number of whom appeared to be very interested in the many details which differed considerably from regular practice. Unfortunately space will not permit us to deal as fully with this model as it deserves, and we shall endeavour on some future occasion to give a more complete description of the chassis. The whole design gives a clear indication of a careful study of the requirements of a machine intended for hard work with practically no skilled supervision. The outstanding features are a combination of large size transmission parts with moderate weight, accessibility to all wearing parts, the possibility of taking down any one part without disturbing others, and the ease of adjustment of all wearing parts. Moreover, the details in the system of lubrication are both efficient and practically fool-proof. The frame is of an alloy steel of heavy gauge and of pressed channel section, with cross members partly of tubular and partly channel section, a special feature being that all the shackle pins have oil boxes made as an integral part of the pin. The engine is of the 4-cylinder type, cast in pairs, 4½ in. by 5½ in., with valves of large diameter on either side. The water circulation is on the thermo-syphon system, with spring-mounted radiator of the gilled-tube type. The leather-faced cone clutch is supported on an extension of the crank shaft to which also the fly wheel is flange-bolted, a pair of ball bearings greatly facilitating the action of the clutch. By merely removing a few bolts the clutch can be withdrawn without interfering with any other part of the machine. The gear box gives four speeds and a reverse, and is fitted with an ingenious selector mechanism with a view to overcoming all gear changing difficulties. From the gear box the power is transmitted to the worm-driven back axle by a universally jointed shaft. Cast-steel wheels are fitted, and in addition to the ordinary foot brake and hand-lever brake acting on the rear wheel drums, an extra emergency brake is also applied to the rear wheel drums. The adjustment of all the brakes is by thumb screw, and can be instantly made when required.

**Durham Churchill and Company** had two specimens of their 45-50-H.P. models on their stand. The more attractive was the torpedo char-a-banc with seating arrangement for 22 passengers. This was a very handsome machine, and was built to the order of the Yorkshire Motor Car Company.

**New Girling Commercial Cars, Limited,** had a most interesting display of their light delivery vans mounted on their special 3-wheel chassis. These were all fitted with 6-H.P. engines, and varied in carrying capacity between 3 and 5 cwts. In these cars the driver sits in front and thus has a clear view of the road. The cardan shaft transmission with the bevels running in clear grease takes the place of the chain. The engine is water cooled through a large front radiator. Steel artillery wheels, which are used, are detachable and interchangeable. Bodies can be provided suitable for all businesses, and prices range from 100 guineas upwards. The Girling commercial traveller's vehicle with detachable box for samples is a specially convenient car.

**Shrewsbury and Challiner Tyre Company, Limited.**—The special feature of the exhibit on this stand was the heavy cross-ribbed tyre which has been designed for fire engine work. It is claimed that the special formation of this tyre makes it impossible to skid. The success of this form of tyre has encouraged the firm to manufacture it in lighter sections, two of which were also shown on their stand.

**S. Smith and Sons, Limited,** exhibited a large range of specialities of interest to users of motors of all classes. These embraced lighting outfits for industrial vehicles, both for the use of electricity and acetylene. The "Eureka" carburettor was also shown, and we understand that most excellent results have been achieved with this on all types of heavy machines.



Plan View of McCurd Chassis.

Daimler Char-a-banc.

**The Daimler Company** have entered the delivery van field with the smart 10-cwt. vehicle shown in the accompanying illustration. The chassis which was shown at the exhibition is a very interesting

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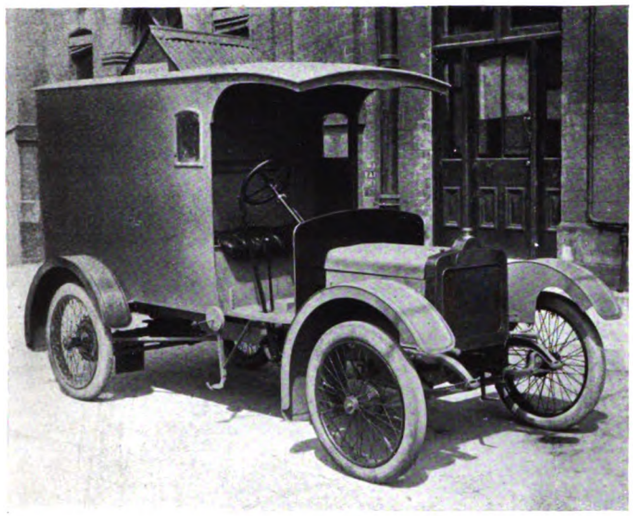
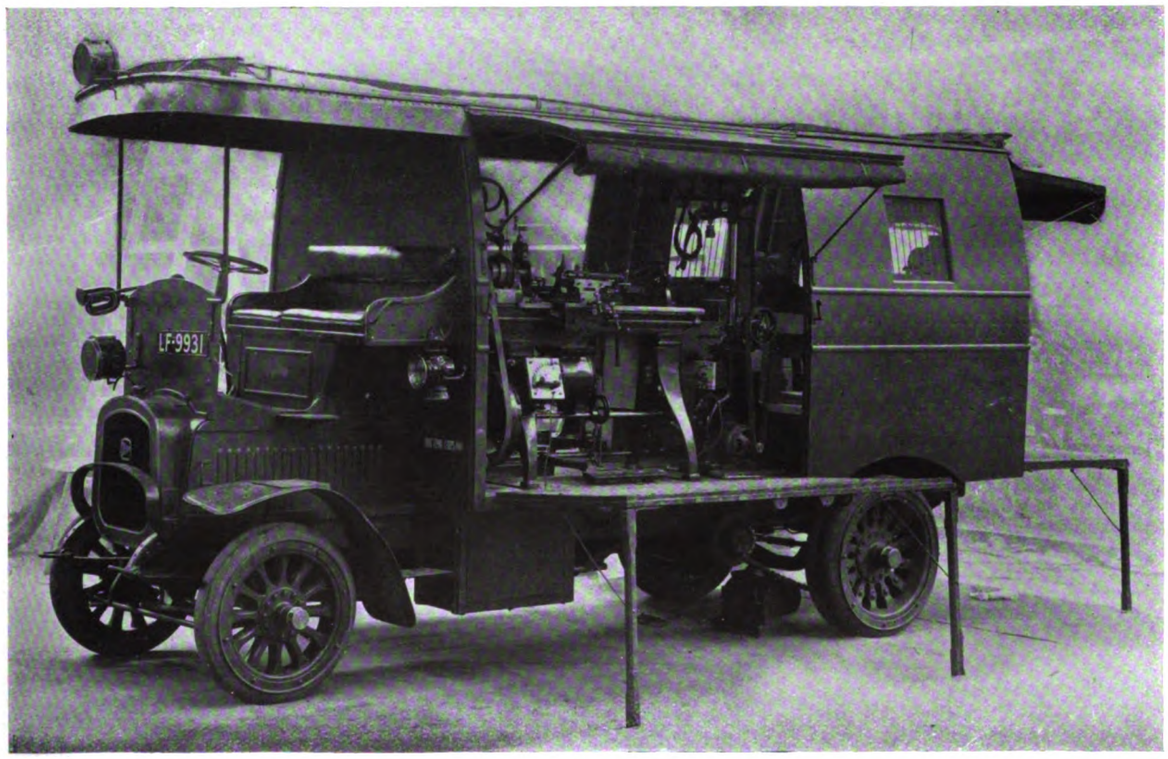
# MOTOR TRAFFIC.

production embodying some special features. The key-note of the design is its simple construction and control Any youth who has been considered sufficiently intelligent to manage a horse delivery van should be able to gain the necessary skill in handling this Daimler "express" after three or four days' tuition. The engine



New Daimler Light Van.

is, of course, of the sleeve-valve type. As far as ordinary running is concerned there should be no need of any attention from the driver other than the weekly filling up of oil. A cone clutch conveys power by means of a propeller shaft enclosed in a universal joint to the engine, the driver has now only one unit. Secondly, the usual transmission losses in the universal joints are cut out. Thirdly, there is an entire absence of noise from the transmission gear which results in the added advantage of silent running; this must be counted an important point from the advertising value of the delivery van. Nothing is so likely to create a favourable impression as a well-finished silent-running van of this type. This is so well appreciated that many small firms, whose deliveries are really not sufficiently extensive to warrant the introduction of an express motor van on the grounds of cheaper running cost alone, are purchasing these little vehicles simply on account of their advertising value. Both brakes are situated on the rear wheels, and these are powerful enough to meet all the requirements of traffic running. A most important feature is the fitting of detachable wheels, so that chance of delay on the road is absolutely minimised. The control of the van has been simplified to the fullest possible extent. The speed control is entirely by a foot accelerator, and the gear change and brake levers have both been arranged in a position which can be reached naturally by the driver without any exertion. The standard form of van body is a neat production, with the following inside dimensions: 4 ft. 5 in. in height; 3 ft. 9 in. in width; and 5 ft. 1½ in. in length. Internal shelves are fitted when required. Not the least important feature of this van is its light weight, which means, of course, that running costs are proportionately reduced. The chassis weighs about 12 cwt., and the complete vehicle approximately 16½ cwt. Completely equipped with spare wheel, 815 mm. by 105 mm. Dunlop tyres, and full set of tools, the Daimler van sells at a price which brings it well within the range of all retail houses whose present business demands the employment of two or more horsed vehicles. Other exhibits on the Daimler stand, which attracted most interest from the general public, were a 3-ton lorry chassis, showing its working parts, after having been in use 9 months, and the separate parts of a 'bus, which had run a distance of 23,000 miles. The chassis had been opened up so that the visitors could see the condition of each of the working parts after service. An interesting arrangement for drawing attention to each feature of the design was erected over the chassis, and by means of coloured cords




Delahaye War Office Motor Workshop.

torque tube to the rear axle, in the forward extension of which is situated the gear box. The advantages of this construction are three-fold. In the first place, the number of units in the power plant is reduced to two instead of three, that is, instead of having a gear box and a separate back axle to keep lubricated in addition attached to an indicator and the individual parts the special features were made exceptionally clear. A considerable amount of business was transacted with omnibuses and lorries. The new light delivery van also found favour with a large number of visitors, much business also being done with this type.



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# MOTOR TRAFFIC.

**Delahaye and Company, Limited,** staged four models of exceptional interest, chief amongst them being a travelling workshop fitted with a lathe, drilling machine, milling machine, band saw, vices, forge, anvil, etc. Each of the machines is electrically driven, and the vehicle

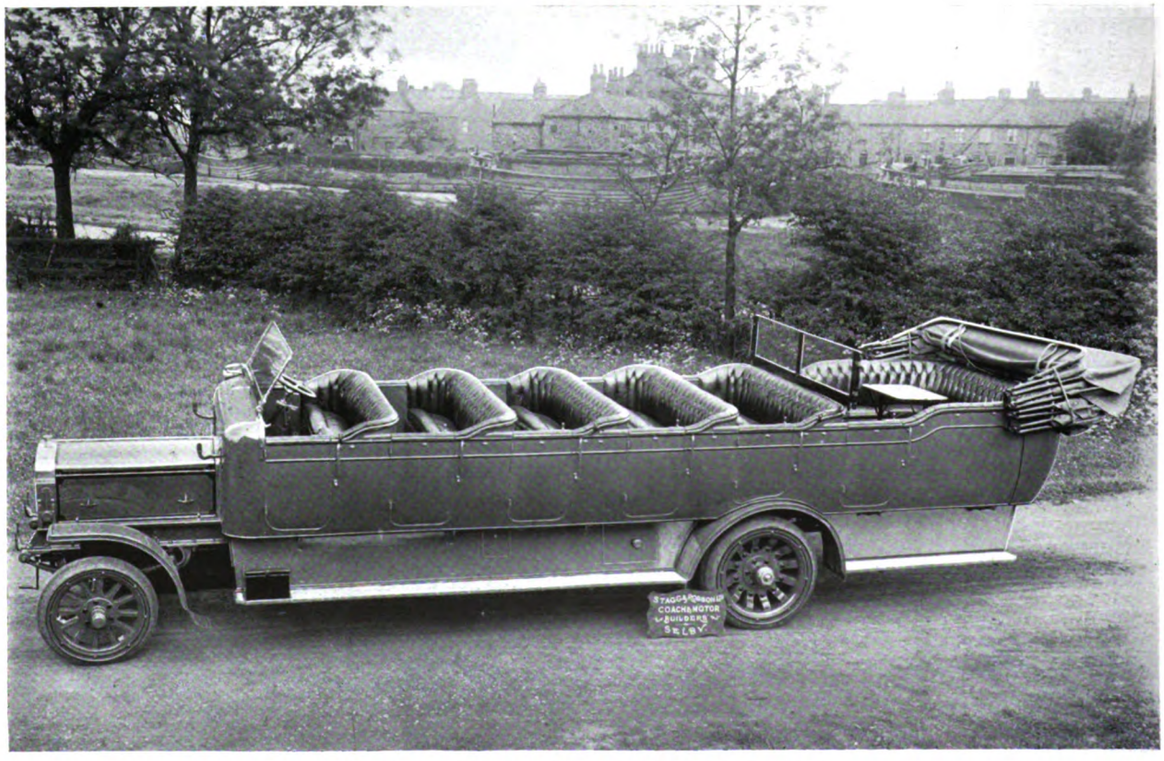
A Corner of the Show.

is designed for military purposes. The hinged sides constitute the platform upon which the engineers work, and, as will be seen by our illustration, the whole machine is most compact in appearance.

**Stagg and Robson, Limited.**—This firm, who have their works at Selby, staged two cars, a 20-seater 40-H.P. passenger vehicle for Colonial use, and a 15-seater 16—18-H.P. car. The chassis, which are of the now well-known "Economist" type, are free from complications. In the case of the 40-H.P. car, the engine mounted is the new type with roller bearings. The chassis is excellently sprung upon long span laminated springs, the rear springs being furnished with shock absorbers. The coachwork is an excellent example of the high capacity touring car, which is a speciality of the company. The small car, which is similar in design as regards the chassis to the one above described, differs only with respect to the engine, which is an "Aster,"

Clayton and Company's Stand.

the reputation of which needs no comment. The coachwork, which is neat in outline, provides for 14 passengers and driver. Upholstered in pleated and buttoned scarlet leather, with comfortable sprung seats and backs, this type of small car should prove very popular. In addition to the exhibits on their stand, Messrs. Stagg and Robson also supplied a large number of their high capacity touring car bodies to other chassis builders, notably amongst which is the Daimler Company.




Stagg and Robson Public Service Touring Car.

"Tylor," giving an ample range of power for heavy work over hilly districts. The drive is effected by means of silent side chains, and the gear box, which has four speeds forward, is practically fool proof, all the gears being made of special steel, carefully hardened and provided

**De Nevers Rubber Tyre Company.**—This old-established firm of rubber manufacturers were showing the De Nevers continuous band tyre in various sections and sizes. The form of construction was also demonstrated.

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# MOTOR TRAFFIC.

**The Midland Rubber Company, Limited,** showed specimens of all types of "Midland" solid and pneumatic tyres, varying in sizes and patterns. Solid band tyres are standardised in three distinct sectional designs, viz., square tread, round tread, and concave or "T" pattern. The exhibits included solid band tyres up to 170 mm. section, suitable for heavy steam traction work; grip or clincher solid tyres for light commercial motor work; grooved, ribbed, and steel-studded "Midland" and "Britannic" pneumatic tyres manufactured specially for commercial purposes; and specimens of wheels, steel felloes, and flanges, single and twin type, complete with tyres, suitable for various classes of work. The firm were also showing two band tyres which have returned from the London General Omnibus Company after running the following mileages: Tyre No. 3,263, which has run 36,818 miles, and is still good for further mileage. Tyre No. 3,235, which has run 35,696 miles. The figures prove conclusively that these tyres put under good conditions and with careful driving can run over three and a half times their guarantee. There is a tyre still running for the afore-mentioned company which up to the present has run 37,558 miles. They have over 500 tyres with mileages from 20,000 to 35,000. It will be interesting to many to learn that the Midland Rubber Company are the contractors for the supply of band tyres to H.M. War Office.

"Tramway and Railway World" Stand.

**The Continental Tyre and Rubber Company (Great Britain) Limited.**—The leading feature of this exhibit was the famous "Continental" "T" pattern solid tyre. This is the original "T" section tyre, as opposed to the "round" pattern, the chief advantage lying in the fact that the wearing surface remains practically the same width from the beginning to the end of the tyre's life, thus insuring with the extraordinary resiliency the extra mileage, on which the Continental company principally base their claims. It is interesting to note that over 34 per cent. of the vehicles exhibited on the stands were fitted with the company's "T" pattern tyre. Sections and complete tyres, as well as the "Continental" twin solid tyre wheel, were shown, and full particulars obtainable. Users of the lighter types of delivery vans showed considerable interest in the Continental twin detachable rim for pneumatic tyres. The twin rim is quite as simple in operation as the now famous "Continental" single detachable rim. A record was kept of nearly 700 "T" pattern tyres, used consecutively on Messrs. Tillings' motor omnibuses, and the average was over 20,000 miles per tyre. These tyres are largely used throughout the country. Visitors were invited to ask for the company's souvenir booklet, "All about the 'Continental' Solid Tyres," in which was to be found a great deal of information regarding the wearing qualities. The drivers' bonus scheme, inaugurated by this company some two years ago, has proved a great success. Many hundreds of bonuses have been paid, and owners have expressed their hearty approval of the scheme in practice.

**Charles Macintosh and Company, Limited,** made a feature of a collection of used tyres which were piled up one on the top of another in the front of their stand. On each of these the mileage record was painted, and as the records ranged from 17,000 to 41,000 miles, it will readily be understood that visitors concerned in the running of heavy vehicles were very much interested.

**J. and E. Hall, Limited,** included five distinct models in their exhibit. These included machines for all kinds of service, and were in themselves excellent examples of the output of this old-established firm of

Halford Char-a-Banc.

engineers. A brief description of the exhibits is as follows: 5-ton tipping wagon: This was a screw-operated hand-tipping wagon, and is the fourth of its kind to be delivered to the Sheffield Corporation. It is fitted with a 32-H.P. 4-cylinder engine. 4-ton brewer's wagon: This had a skeleton-sided lorry body with overhead sign, mounted on one of the "Hallford" standard 4-ton chassis, fitted with 32-H.P. engine. This is the sixth of this type that they have supplied to Messrs. Watney, Combe, Reid, and Company, Limited, the brewers, and they have recently received an order for a further two. 2½-ton box van: This was one of two to be delivered to Messrs. J. Robertson and Sons, Catford. The body (a box van) is enamelled light green, and is mounted on one of their standard 2½-ton chassis, fitted with a 25-H.P. engine. 3-ton chassis: This is the "Hallford" standard 3-ton chassis, fitted with 32-H.P. 4-cylinder engine of 110 mm. bore and 140 mm. stroke. Char-a banc: This was a flush-sided torpedo type of char-a-banc with fixed canopy. The seats are leather upholstered, and the vehicle will carry 22 passengers very comfortably. All the metallic

Continental Tyre Company's Exhibit.

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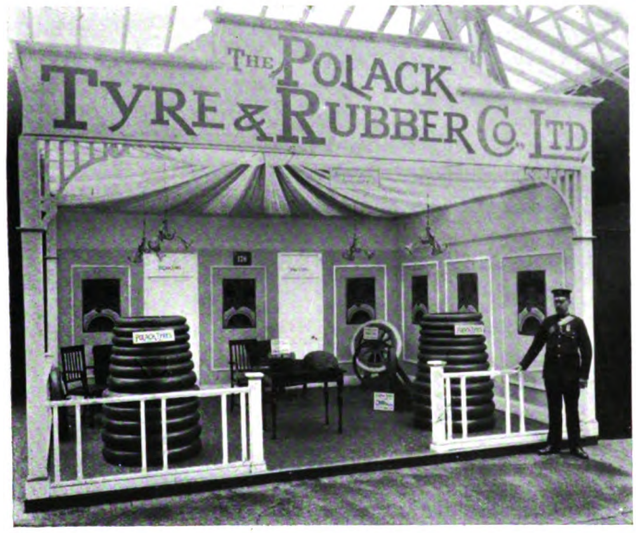
# MOTOR TRAFFIC.

fittings are nickel-plated, and the vehicle is finished in a delicate shade of French grey. The chassis is fitted with a 32-H.P. engine, which will enable the vehicle to negotiate the stiffest hills with perfect ease. This char-a-banc is a remarkably fine piece of workmanship, and was greatly admired by visitors to the show. Fire tender: This included extension ladder, gas bottle, hose reel, hose boxes, and all necessary appliances for rendering first-aid in case of fire. The chassis is one of their standard 30 cwt., but fitted with a 32-H.P. engine, which will enable the machine to take the stiffest hills at a good speed.

**The Hillman Motor Car Company, Limited,** had an interesting exhibit which included one 10-H.P. Hillman wagon chassis, fitted with box van body and wheels, with Dunlop grooved tyres; one chassis of the same type but with a smaller body; one chassis fitted with wagon body and detachable canvas top, and one 10-H.P. Hillman wagon chassis.

**The Polack Tyre and Rubber Company, Limited.**—Prominently displayed upon this stand was a set of tyres removed for exhibition purposes from a 2-ton Commer car after running 2,700 miles, and from their present condition it was obvious that they were good for several thousand miles more. A complete range of solid tyres were also shown; these included the smaller section made for light delivery vans, up to the larger sections suitable for steam wagons and the heaviest forms of motor traction up to 12 tons. Samples were also shown of the finest Para rubber used in their manufacture. A special




feature was also made of the lagging method of fitting Polack tyres in the Colonies and places where customers have not the facilities afforded by the tyre press. A wheel fitted with lagging strips of hard timber between the felloes of the wheel and the steel band of the tyres served to illustrate the method of operation. The strips of timber are slightly wedge shape, and are forced between the felloe and steel band by means of a detachable band screwed into position by a number of bolts placed at regular intervals round the face of the band. We understand that this method of fitting tyres has been in operation for some months with complete satisfaction.

**Electric and Ordnance Accessories Company, Limited.**—The special feature in this stand was the "Timken" roller bearing, which is designed to take the thrust as well as the radial stresses. A large range of sizes were shown suitable for practically every type of vehicle.

**B. F. Goodrick Company, Limited.**—An interesting exhibit on this stand was a model of the firm's demountable wireless solid tyre, which was shown in twin form on a wood wheel.

**J. Liversidge and Sons, Limited,** were represented in each section of the exhibition. On the ground floor they staged some excellent specimens of their body-work which both for soundness of construction and finish was all that could be desired. In the gallery they showed the Liversidge solid tyres in plain band form, notched tread, and grooved tread. These were displayed both fixed to wheels and separately.

**The Dunlop Rubber Company, Limited,** had a most comprehensive display of heavy service solid tyres, including a special tyre for use on all types of commercial vehicles, intended to give the maximum resiliency whilst offering the greatest resistance to the destructive tendency of service upon indifferent roads. It is made in all the sizes enumerated in the company's trade list. The Dunlop pneumatic motor tyres were also shown in all of the company's well-known types which are intended for and largely used on delivery vans, and the lighter types of commercial vehicles generally. The Dunlop solid tyre, as fitted upon most of the largest fleets of public service vehicles in the country, is too well-known to need comment here, but some evidence of the service given by these tyres is afforded by figures which the company has recently published relating to the large numbers of tyres running upon various fleets of public service vehicles operating in London. In these cases the tyres are supplied on a basis of payment for mileage run. Exact records of this mileage are kept by the companies owning the vehicles. These records show that the mileage for the whole of the Dunlop solid tyres referred to give an average for all sizes, including both back and front tyres, largely in excess of the 10,000 miles' service for which all Dunlop solid tyres are guaranteed. The figures cover no less than 5,409 Dunlop solid tyres, which have completed the above satisfactory service during the present year. The company showed for the first time a new solid tyre which has been produced specially for commercial vehicle work on provincial roads. This tyre will be known as the Dunlop "heavy service" solid tyre. It is suited to all types of commercial vehicles, and will be found to combine with the maximum resiliency the greatest durability and capacity for standing the exceptional wear due to heavy loads and hilly and indifferent roads.

**J. I. Thornycroft and Company, Limited,** included a new type of lorry in their exhibit, which had been designed to comply with the War Office requirements for subsidy vehicles. This machine, which is capable of carrying a gross load of 4½ tons, has a tare weight of about 2½ tons. The engine is of the 4-cylinder type, cast in pairs 4½ in. by 5 in., with the valves arranged on either side. A 4-speed gear box is fitted, giving speeds of 2¾, 5¼, 8¾, and 15 miles per hour, the casing being made of forged mild steel. From the gear box the power is transmitted by a propeller shaft running in a torque-tube to a live back axle. The reduction gear and differential are all contained in a casing bolted to the dead axle, which is a steel forging carrying the entire weight of the vehicle. A double reduction is used in the live axle, the propeller shaft transmitting the power to a short countershaft by spur gear. An external foot brake is provided on the propeller shaft, and internal expanding brakes on the back hubs operated by hand lever. A "Colonial" model originally designed for the Japanese Government was also shown on this stand, and attracted considerable attention. The engine in this model is the same as described above, the final drive, however, is by side chains, and the gear box gives only three speeds.

**Christopher Dodson, Limited,** had some excellent specimens of body work on their stand. These included the latest type of London omnibus which was illustrated in our issue of July 10 and which has just commenced service. This body found much favour with a number of provincial tramway authorities, and we understand that definite orders were placed at the show for a number of similar vehicles. Another attractive exhibit was a convertible char-a-banc to seat 25 passengers, built to the order of the London and North Western Railway Company. The seats are arranged in tiers, so that the vehicle is admirably suited for town and country sight-seeing. All the windows are detachable, and there is a complete electric lighting equipment.

**C. A. Vandervell Electric Lighting.**—For many years C. A. Vandervell and Company's electric lighting sets have stood the test of use in private motor cars, and they have now made a most successful bid for public passenger and commercial vehicle lighting. A little over 12 months ago it was a reproach to London motor 'buses that their lighting was not very good. Now, in at least 300 of the London General omnibuses the lighting rivals the illumination of the tramcars, shedding its brilliancy over many a poorly-lighted suburban road, and being as effective a deterrent to the would-be housebreaker or footpad as a large addition to the police force. A complete C. A. Vandervell lighting equipment was exhibited in a motor omnibus body. Other features were electric lighting sets for commercial vehicles, and the C. A. Vandervell-Ruttardt magneto, especially suited for commercial vehicles.

**Simplex Rubber Company, Limited,** exhibited a wide range of solid tyres, and a pair of front and back cast-steel wheels fitted with their tyres for a Straker van, and also a pair of heavy steam wagon wheels fitted with their heavy pattern tyres, designed for the heaviest of transport work.

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# MOTOR TRAFFIC.

## IMPERIAL MOTOR TRANSPORT.

IMPORTANT CONFERENCE IN LONDON.

Great success attended the happy idea of holding an Imperial Motor Transport Conference in London from July 18 to 25, the period of the Commercial Motor Exhibition organised at Olympia by the Society of Motor Manufacturers and Traders. The Executive Committee of the Conference included representatives of the Army Council, the Dominion and Colonies, the various automobile organisations, the London General Omnibus Company, and the Society of Motor Manufacturers and Traders. Prince Arthur of Connaught kindly acted as president, the chairmanship of the Executive Committee was undertaken by the Hon. Arthur Stanley, M.P., and the duties of hon. secretary were in the capable hands of Mr. Horace Wyatt, who was assisted by Mr. David Bell and Colonel C. C. Townsend, R.A.

Among the delegates were representatives of the Government civil departments, military forces, railways, chambers of commerce, and various industries of India, Canada, Australia, South Africa, New Zealand, Crown Colonies, and Dependencies. Numerous interests within the British Isles also sent representatives, including municipal authorities.

On July 18 the delegates attended the opening of the Olympia Exhibition by Prince Arthur, who also discharged the arduous task of receiving the delegates individually. Subsequently they were entertained at luncheon by the Society of Motor Manufacturers and Traders, when Prince Arthur proposed "The Industry," and remarked that the large attendance of Colonial visitors reminded him of the great and growing Colonial market which existed. Mr. F. S. Edge, president of the society, in responding, referred to the wonderful progress which the industry had made since the last show in 1908. The exhibition had succeeded beyond the dreams of the greatest optimist. Mr. E. Manville proposed "The Visitors," and the Hon. A. Stanley, in reply, referred to the interest which the Government had shown in the exhibition, and he expressed the hope that such events would become a permanent feature of the industry. In the afternoon the delegates inspected the exhibits.

Appended are excerpts from the various papers which were read, and the decisions arrived at by the Conference, which sat at Olympia on July 21, 23, and at the Royal Automobile Club on July 25.

### PETROL SUBSTITUTES.

Sir BOVERTON REDWOOD, Bart., and Prof. VIVIAN B. LEWES, read the first paper at the opening sitting on July 21. It was entitled "Petrol Substitutes for Use in Motor Vehicles." The authors stated: The present high price of petrol, and the apprehension of increasing scarcity, with even higher resulting cost, has naturally directed attention to the question of possible substitutes, obtainable in adequate quantity at moderate cost It may be desirable as a preliminary step to dismiss from consideration the popular impression that the high price of petrol is mainly due to trade combinations and artificial restriction of output, and to recognise that the advance in cost has been directly brought about by the gigantic increase in consumption. Since 1905 the imports of petrol into England had risen from 18 to 80 million gallons, and it is probable that the consumption this year will amount to 100 million gallons. In America the demand has increased at an even greater rate, and the same conditions exist in all European countries. Spain, and to a great extent Germany, have no oil fields at home to supply the local demand, and are therefore dependent upon the surplus over and above that needed for home consumption in the countries that have oil fields. The 80 million gallons used in the British Isles last year were drawn from the following sources: Dutch East Indies, 46 million gallons; America, 16 million gallons; Russia, five million gallons; Roumania, four million gallons; other countries, nine million gallons; so that more than half our supply came from the fields of the Royal Dutch and Shell Companies, whilst the American supply, which, up to five years ago, was our chief source of petrol, had now shrunk to one-fifth of the total. With regard to the petrol supply, it must be borne in mind that last year the world's total production of crude oil amounted to 50 million tons, and that the growth in the production of crude oil has less than doubled itself since 1905, whilst the demand for petrol has more than quadrupled. Another factor which has tended to increase the price has been that we have been suffering from insufficient transport facilities, but that the excess of demand over supply is the chief factor is shown by the very high price of the crude oil at the oil fields. In these circumstances it is of the highest importance to find some other source or sources for a considerable proportion of the motor spirit needed. The only sources from which this is likely to be obtained are: 1, Those portions of crude petroleum other than the petrol fraction; 2, products of the destructive distillation of coal and shale; 3, products of fermentation.

HOW PUBLIC AND TRADE VEHICLES CAN EFFECT A SAVING.

After discussing the yield of motor spirit from crude oil, the authors said: The carburettor, which is the all-important factor, has received a smaller amount of attention than it deserves, and much may yet be done in the direction of making carburettors better adapted for use with the heavier grades of petroleum products. For many years past attempts have been made to use for motor purposes the fraction of petroleum having a specific gravity of about 0·8 which is usually employed as lighting oil, and many patents have been taken out for making motor spirits composed of such oil mixed with sufficient petrol to give the necessary volatility to start the engine. A study of these patents reveals the fact that in most cases the patentee uses a mixture of about 40 per cent. of petrol with kerosene of a specific gravity of 0·8, and depends for the novelty of his invention upon the introduction of various substances intended to aid the *pro rata* evaporation of the heavier portions of the mixture. With several forms of carburettor on the market, such a mixture gives excellent results when used under uniform conditions, but it lacks the elasticity necessary for congested traffic, where constant slowing down, stopping, and restarting are requisite, and is apt to give rise to starting troubles in cold weather. These objections have been met by providing a small supplementary feed tank containing petrol, which is used for starting the engine and keeping it running until the system is warm, when the main tank, containing the mixture or even ordinary lighting oil of a specific gravity of 0·8, can be connected, and the running continued satisfactorily until the need for stopping occurs, after which the petrol is again turned on to give the necessary starting power. By the adoption of such methods the requirements of the public motor vehicle and trade wagon can be met, with a saving of 20 to 40 per cent. in the consumption of petrol.

A PLEA FOR HOME-PRODUCED ALCOHOL.

Adverting to the products of the destructive distillation of coal and shale, the paper stated: At the present time there is no commercial process working on a large scale which will yield more than the three gallons per ton of coal carbonised that can be obtained from coke oven practice, and the total amount of benzene so recovered will amount to about 8,000,000 gallons per annum, a large proportion of which is exported. Much might be done in the direction of replacing the bee-hive coking ovens, that still exist to a very large extent in the north of England, by recovery ovens, but as matters at present stand the amount of benzene available is so small that any large demand would cause it to rise in price even more rapidly than petrol has done. The Scotch shale oil industry is another source from which motor spirit might be obtained, but the 600,000 gallons which represent the annual output of distillates fitted for this purpose is only about 0·75 per cent. of the total petrol used last year, and a considerable proportion of this is marketed for solvent purposes. The heavier portions of the shale oil, however, lend themselves to cracking purposes, so that unless these fractions are all absorbed for fuel oil they might in the future prove a source of supply.

The authors concluded: It must be borne in mind that any petrol substitutes made from petroleum, coal, or shale are only obtainable in a limited quantity, for in each case the store of raw material is in process of depletion. On the other hand, alcohol is a motor spirit which can be continuously manufactured in any required quantity, and if the Imperial Motor Transport Conference only realises this fact and uses its influence in the first place to stimulate the designing of an engine and carburettor best fitted for use with this liquid, and,

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secondly, to induce the Government to give the necessary facilities for the manufacture and use of methylated spirit for the purpose, it will have done much towards giving this country a home-produced source of power of which no foreign entanglements can rob us.

By fermentation in bulk, continuous distillation, and judicious methylation, all the motor spirit needed can be obtained and sold at something like 1s. a gallon, and the extended researches of the United States Government have shown that engines can be satisfactorily run on alcohol, whilst in spite of the calorific inferiority of alcohol practically the same power is generated as with petrol, owing to the cooler cycle, smaller quantity of air required, and greater compression that can be used without fear of pre-ignition. Thousands of acres of land fitted for the growth of potatoes and beet are lying idle in Ireland and even in England, and when it is demonstrated to the satisfaction of the Government that the motor is ready for the new fuel, the required facilities could no longer be withheld.

IMPORTANT DECISION BY THE CONFERENCE.

Mr. A. W. SOUTHEY submitted a proposal, which was seconded by DR. LESSING, to the effect that an adequate amount of spirit could be obtained from coal-tar oil. This, however, was negatived.

The Conference adopted the following resolution, on the motion of Sir BOVERTON REDWOOD: "That having regard to the high price of petrol and the limited quantities of petroleum, coal, and oil shale available, and the obvious fact that these sources of volatile liquid hydrocarbons are in course of depletion, it is desirable that attention should be directed to the construction of a motor suited for use with alcohol, and that, concurrently, action should be taken with a view to the ultimate creation of an adequate supply of fuel obtainable at a sufficiently low price."

It was resolved that a committee should be appointed to further the idea and to suggest ways and means.

## STANDARDISATION FOR MILITARY PURPOSES.

On July 23 Colonel H. C. L. HOLDEN, C.B., F.R.S., late R.A., in the course of a paper on "The Standardisation of Mechanically-Propelled Vehicles for Military Purposes in Time of War," said: The object of the present paper is to deal with the vehicles themselves, their type and details of their design, having special reference to the requirements which have to be met in order to make them suitable for military purposes. The experience of the last eight or ten years has proved that the lorry driven by an internal combustion engine using petroleum spirit or similar fuel is the one which best fulfils not only commercial requirements, but also the needs of the transport columns of the Army. Up to the present all practical vehicles driven by steam engines have required a comparatively large amount of water after traversing a few miles. On the other hand, the internal-combustion-engined vehicle requires very little water, and that only to make up losses occurring in most cases from accidental causes. The adoption of a commercial vehicle suited, as this is, only to ordinary roads practically confined the operations of the military transport when using these vehicles to the same roads, and any distribution of stores involving going across country will have to be effected in the usual manner by means of horse transport. The types of mechanically-propelled vehicles which have been selected as most suitable for military purposes are two in number—internal-combustion-engined lorries, having wheels shod with solid rubber tyres, and carrying useful loads of 3 tons and 30 cwts. respectively. The 3-ton vehicles are officially designated as coming under Class A, the 30-cwt. type under Class B. The author dealt at length with the requirements which have to be fulfilled by subsidised vehicles, and mentioned that already quite a number of the principal makers of lorries have submitted vehicles to the trials which have been held by the War Office, and have been successful in having their vehicles approved as types which will be subsidised if and when required.

## VEHICLES REQUIRED ON MOBILISATION.

Capt. A. E. DAVIDSON, R.E., secretary of the Mechanical Transport Committee, contributed a paper dealing with "The Provision of Motor Vehicles Required on Mobilisation by the Chief Military Nations of the World." In the course of his remarks he said: The amount of transport which is required in peace is far less than that required in war, and in order to find work for the vehicles - should a Government decide to maintain and work its war establishment in peace—it would be necessary to compete with the carrying trade in the country. It is true that the postal services and other Government departmental duties would absorb a large number of vehicles, but there would still be a number of vehicles unemployed. The capital expenditure required for purchasing the requisite number of vehicles would not only be heavy but recurring, as the vehicles would have to be replaced, say, every three to five years, and a reference to the table appended to this paper will show the economy of a subsidy scheme, since instead of paying between £700 and £1,200 for a new vehicle each time it had to be replaced, a sum varying from £110 (Great Britian) to £450 (Germany) was paid instead, and there is no expenditure on the equipment, construction, and upkeep of large Government garages.

In Great Britain there are far more commercial vehicles of all types in operation than in any of the Continental countries. It would, therefore, be possible on the outbreak of war to requisition as many vehicles as are required, and Parliamentary power to do so has been obtained. The drawbacks to this arrangement are that it would take some time to get hold of the necessary number of vehicles, and it would not follow that they were maintained in a reasonably good condition with sufficient tools and spare parts. Also, great confusion would arise owing to difference of type, and there would be no interchangeability of even important parts as between one make and another. Of all the Continental countries named Great Britain lays down the greatest degree of standardisation, and insists on the nearest resemblance between one maker's productions and another. A certain amount of interchangeability as between make and make is insisted on in the specification for these subsidised vehicles, and some of the parts which are likely to be most frequently damaged, such as radiators, are interchangeable. With the sum of money which was provided for the subsidy, it did not appear possible to insist on a greater degree of interchangeability than has been laid down. It would, for instance, have been a great help if engines, gear boxes, and other parts could be interchangeable, as units between one vehicle and another. Such a standard would have necessitated the giving of a larger subsidy. With, however, such a large number of vehicles being used in the country of a type that would be fairly serviceable for military requirements, it was considered that the sum of £110 would be sufficient to enable the requisite number of vehicles to be obtained under the subsidy scheme.

MOTOR VEHICLES FOR MILITARY PURPOSES.

| Country. | Amount of Subsidy. | Number of Years Vehicles are Subsidised. | Useful Carrying Load of Vehicles. | Road Speed, Miles per Hour. | Types of Vehicles Subsidised. |
|---|---|---|---|---|---|
| | £ | | | | |
| Great Britain | 110 or 120 | 3 | 1½ tons or 3 tons... | Max. 16, Av. 12 | Lorries only |
| France ... | 300 (for a 3-ton lorry) | 4 | 2 tons and over... | Av. 9 | Lorries, lorries with trailers, and road trains |
| Germany | 450 | 5 | 4 tons on lorry, 2 tons on trailer | Max. 10 | Only lorries with trailers |
| Austria ... | 360 | 5 | 3 tons on lorry, 2 tons on trailer | Max. 10 Av. 6 | Do. |
| Italy ... | Vehicles owned by Government | — | 1½ tons & 2½ tons | — | Lorries only |
| Russsia ... | Do. | — | 1½ tons & 3 tons | — | Lorries |
| U.S.A. ... | — | — | 1½ tons ... ... | | Lorries |

## DESIGN FOR COLONIAL PURPOSES.

Capt. R. K. BAGNALL-WILD, R.E., contributed a paper on "Design of Commercial Vehicles for Colonial Purposes." No one design can fulfil all requirements; this question must therefore be considered under several headings. Primarily, the road conditions and even the existence of roads at all are of chief importance as affecting design. Then climatic influences must be met and the influence of altitude taken into account. Many cases exist where the transport has to be conducted over roads which vary from first class to mere tracks, and this appears to be the more usual Colonial problem to be faced. To meet it undoubtedly some difference must be made in design. Firstly, larger wheels are essential, also larger tyres, the former to give greater clearance between the axles, etc., and the ground and to give easier running. The latter are, of course, involved by using the bigger wheels, and secondly, are advisable on account of their much increased life on indifferent roads as compared with smaller tyres. Solid rubber tyres are essential for lorries, and the larger the better within reasonable limits. Economy in spite of increased capital outlay will result from the use of large tyres. In comparing quotations for vehicles special care should be taken to compare sizes of tyres. For rough work, the majority of manufacturers produce a special model, and a number of special features in design are sometimes added which are quite unnecessary. The main points are, big wheels and a frame and engine of size and scantling to carry 20 to 25 per cent. more load under English road conditions than is required to be transported under rougher circumstances. For instance, for a 3-ton useful load a lorry must be built to deal with four tons under English conditions. Variations of climate affect the circulating system, the carburation and lubrication. A departure from home standard is necessary to meet tropical or arctic conditions.

The leading manufacturers now have experience which enables them to fulfil any requirement. They can quote for any climate. Colonial

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inquiries are frequently accompanied by long detailed specifications, which involve special manufacture at a price beyond normal, and which more often than not are unnecessary. It is difficult at the end of a six weeks' post to answer and argue the various points embodied in these specifications. It is better for the intending purchaser to spend time and money in submitting lengthy and detailed descriptions of roads, gradients, climate, loads, labour, fuel, etc., and to ask manufacturers to quote to suit. A careful study of the replies should render a decision easy, and will effect a saving in capital outlay. The manufacturer can best say how to alter his standard design, and is in the best position to know the results he can obtain. There are sometimes conditions which require extensive alterations in design. In Ceylon, for instance, bridges, road width, and hairpin bends invite short, narrow vehicles, with a limit to total load and a large steering lock. A manufacturer will build anything at a reasonable cost if sufficient numbers are required, but the price becomes prohibitive for small numbers. There is one very important point that must not be overlooked, and that is gear ratios. There is obviously a difference between a London 'bus and a char-a-banc used by the Great North of Scotland Railway. In the one case, easy gradients and first-class street surfaces; in the other, very severe and lengthy hills with indifferent roads. For Colonial work a four-speed box is required, and, further, the difference between the first or bottom speed and the top should be a wide one. The War Office subsidy type includes a gear box, which is most suitable for Colonial work. Much can be said for and against the military types when considered from a commercial standpoint. In the first place, they are built for a special purpose, obviously not a commercial one, but many points embodied in the W.D. specification fit in with Colonial requirements; gear box, large wheels and tyres, large radiator, engine, and chassis generally are suitable for heavy work; in fact, the 3-ton W.D. type will carry four tons under normal English conditions. On the other hand, such general interchangeability is not so necessary in commercial work. Bonnet, foot pedals, engine control rods, axle arms, final drive, etc., have to be standard, of whatever manufacture the car may be. From the military point of view, such interchangeability of parts is an essential, but the W.D. have to deal with vehicles of varied manufacture, whereas the private owner can employ all of one type, and so obtain the desired result at less cost. The choice between steam and internal combustion engine resolves itself into a consideration of fuel, water, and speed conditions, and, provided the same are favourable, steam undoubtedly has many advantages for heavy haulage. When in quest of a suitable design for a given object, avoid non-standard unless ordering in quantities of 100 at a time; give manufacturers your wants with local information; ask their nearest experience; and from the replies received no difficulty should be experienced in selecting a suitable model.

## EMPIRE MILITARY TRANSPORT.

Mr. HORACE WYATT, editor of *Motor Traction*, read a paper "On the Means of Rendering Adequate Motor Transport Available for Military Purposes Throughout the Empire." His remarks enlarged upon the two following points:

(1) That the Mechanical Transport Committee should consult, whenever their programme touches on civilian requirements, with some body representative of users, manufacturers, and engineers throughout the empire.

(2) That the Indian, Dominion, and Colonial Governments and municipalities should be encouraged to assist in the development of an adequate supply of vehicles of types generally approved both for military and for civilian uses.

## MANUFACTURERS AND OVERSEA BUYERS.

"The Relations between British Manufacturers and Oversea Buyers," was the subject of the paper presented by Mr. G. HAMILTON-GRAPES, A.M.I.A.E., of Wellington, New Zealand. He said: I will endeavour to outline the reasons why commercial motor traction has not made the progress it should have done in the Oversea Dominions of the Empire, and at the same time to suggest what appears to me to be the remedy, in the hope that the discussion which may follow will lead toward concrete reformation. First and foremost stands the absence of trained professional advice. This, easily obtained in respect of English conditions, from consultants in London, is non-existant overseas. Up to the present, system in the relations of the principals interested has been non-existent, a prime factor in the many failures which have strewn the path of the young industry. Anyone has been deemed qualified to supply advice and a commercial motor vehicle to a buyer, who has generally been innocently ignorant of his own requirements. As illustrative, I will cite a few instances which have come under my observation lately. One was a motor omnibus designed for use on city streets at home, sent out to work in a practically semi-tropical climate, on a level dusty route. It was fitted with fixed glass sides and small wooden wheels, woefully under-tyred for the rough surfaced road. The springs also were equally unsuitable, having too great a set and being two short. What would have proved more applicable would have been opened louvred shutters for summer, 40-in. steel wheels, detachable twin solid-rubber tyres of 135 mm. section on rear wheels, and long springs built up of many thin leaves having little set. A worse case was one where a buyer imported a 29-seated char-a-banc of such long wheel base and low engine-power that the vehicle on its first trip could neither negotiate the corners nor the grades of the ordinary roads of the district. Result an immediate sacrifice at a considerable loss to its unfortunate owner. Another instance was a brewer's lorry, the design of which was unequal to the grades of the local streets. Sequel, a worm thrust ball-race gave way, and the machine was laid up for four months until complete spare parts arrived from England.

In my opinion a palliative to the above would be found in the more frequent visits of designers to oversea lands, where they could study the conditions governing this problem. Design must go hand in hand with actual practice on the spot. The next step should be the visit to the Dominions of commercial organisers, who could then ascertain for themselves the best channels for the distribution of the goods of the home manufacturer. The employment of the purely pleasure car importer, as he exists to-day, is criminally uneconomical. The point is often lost sight of that the oversea Britisher is a very keen buyer, and gone for ever is the day when anything was good enough for the colonist. While naturally preferring to deal with the motherland he often resents the uncompromising attitude adopted by some British manufacturers, which is tantamount to saying: "This is our standard specification of which we sell great numbers, take it, or leave." This want of knowledge of the requirements demanded by oversea conditions gravely approaches a national peril when viewed from the military standpoint, as a condition of success of any scheme prepared, or conditions laid down, by the War Office, must be co-ordination with design suitable for the whole of the Empire.

The key-note of the present War Office specifications appears to be rigidity and weight, whereas we people of the Dominions know that for our work we must have flexibility and lightness. Whippiness in a frame damps out all minor vibrations so insidiously destructive to the vital components of a chassis, whereas unbending stiffness courts and embraces the smallest. An acceptance of the accumulated *data*, based upon constant practice, now to be obtained from overseas, and the embodiment of such in British commercial vehicle design, would not make this vehicle one whit the less useful for purely home work—as greatly increased reliability and reduced running costs could be absolutely relied upon—but would make for the homogeneity of the military transport columns of any Dominion of the empire operating in any part of the world. For many years military exigencies must be met by the number of privately-owned commercial vehicles capable of fulfilling subsidy requirements, and now that the oversea trade is worth catering for, both demands should be met simultaneously. I advance for your consideration a few suggestions based upon my experience in Australasia for the past decade, in public service and commercial motor work, which may serve to show the trend or alteration of design necessary for the reduction of operative costs, and for a full measure of efficiency in motor vehicles, whether for commerce or for military purposes in our Empire overseas: Reduction of tare weight in relation to engine power; heavy spirit carburettors; three point suspension of power unit; light, large diameter steel wheels of strap suspension design; tyres of larger section in proportion to load carried; long, many-leaved springs; absolute dust-proofedness; governed engine and accelerator pedal for emergencies; accessibility; standardisation; minimum of unsprung weight; chain cases; single plate, or cone leather clutches; more powerful brakes, fitted with gilled radiators: strengthening of main frame side members by adjustable tension-rod trusses; increased wheel lock; front wheels to track with rear; subsidiary pneumatic shock-absorbers or cumulative springs; more ample cooling fitments; variable fan-speed; lateral windlass fitment.

## MOTOR TRANSPORT IN SOUTH AFRICA.

Mr. W. W. HOY (general manager of the South African Railways and Harbours) discoursed on "Motor Transport in South Africa, with Special Reference to the Organisation of Services Connected with the Railway Systems." In the course of a lengthy paper he said: The use of road motor transport is regarded as a system especially suited to South African conditions, and it is thought that the system should prove of great value for developing outlying districts sufficiently until the traffic offering justifies the construction of a line of railway. As

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regards the use of self-propelled vehicles for the delivery of goods at the larger towns where the roads are good, the conditions approximate very closely to those found in Great Britain and the Continent, and the railway department has for several years successfully used these vehicles in Johannesburg, where the fleet consists of 21 traction engines, tractors, and lorries. It is found that for general purposes the light tractor is the most suitable and the best revenue producer, as the engine is not compelled to remain idle while its cargo is being loaded or unloaded. Owing to the absence of large manufacturing houses, the solution of the lorry question by the use of detachable table tops, as used in Manchester and elsewhere, is hardly applicable to present conditions in South Africa, and this system is not expected to displace the tractor with the load carried on trailers. For luggage and parcels delivery the smaller lorries have been a great success, and the service has been much improved by the use of these vehicles. South Africa owes the development of its interior to its railways. The roads are, except in the older established districts and in the neighbourhood of the larger towns, mere tracks across the veld. In many cases, however, the veld affords really good road surfaces, but soft sand is frequently encountered, over which vehicular traffic is difficult. Unbridged rivers, spruits, and dry dongas present further obstacles, though rivers are usually fordable except during heavy rains. Isolated districts with vast capabilities, agricultural and mineral, are to-day lying fallow for want of means of transport, valuable deposits of salt lie untouched for the same reason, and workers find little reward for their labours, as they are unable to dispose of the results of their industry. In spite of the large sums spent annually in building new railways, it is impossible to provide communication to many districts which call for assistance in their struggle for development, nor can the country continue indefinitely to bear the costs of the deficits on developing railway lines.

Several privately-owned motor services are also in operation in South Africa. The Cape Town Tramway Company run a service of 20-seated 'buses to Hout Bay. The distance is about 30 miles, and the fare charged is 6s. The same type of vehicle is also employed to run a regular service between Cape Town and Cape Town Docks, a distance of approximately two miles, at a charge of 6d. per passenger. In Pretoria a motor 'bus service has been established, running between the town and the Country Club, while the Tramways Committee of the Johannesburg Municipality intend running motor 'buses to act as feeders to the tram lines in the same manner as the 'bus is intended to act as a feeder to the railway. At several small country stations considerable use is made of ordinary touring cars for carrying passengers between the stations and adjacent towns or villages.

### Hints to Manufacturers.

The services that would be most generally used could be placed under five heads: (1) Light station omnibus for private service; (2) 30—35-H.P. 'buses for passengers, mails, and parcels; (3) 2-3 ton lorries for fast goods traffic, luggage, and town deliveries; (4) light paraffin tractors for easy services on good roads; (5) heavy paraffin tractors for cross-country trains of trailers carrying 12 to 25 tons of goods. All the vehicles with which we have had experience and which have been of standard construction, as made by the British manufacturers, have so far answered the purpose satisfactorily, though running under conditions far more arduous than those for which they were designed.

If I may be permitted I should like to make one or two suggestions which might receive the attention of manufacturers who may contemplate the construction of vehicles designed to meet South African requirements. Speaking generally, I am of opinion that for cross-country goods traffic, powerful paraffin tractors, with large and wide wheels, will be most suitable. Working costs must be low in order that low rates can be charged for transport. In most cases speed is not a consideration, and in many instances the road conditions will not permit of fast running. In any case, rubber-tyred vehicles for heavy goods traffic cannot be regarded as a practical proposition, where transport has, in some cases, to be done at the rate of 4d. per ton per mile.

The following points are those I would like to put forward for consideration: (1) For passenger vehicles or other rubber-tyred machines, the desirability of using larger driving-wheels and tyres; the size suggested being 1010 mm. diameter and tyres 140 mm. wide. These should be of the detachable variety so that they can be reversed or changed quickly where hydraulic presses are not available. For goods lorries the fitting of spring wheels with steel treads for use on roads other than macadamised, for speeds up to 10 miles an hour, is also suggested. (2) The necessity of fitting efficient sprags to hold the vehicle on a hill. The usual trailing sprag is not satisfactory on soft ground. (3) The use of paraffin or alcohol as fuel. As regards the former, most satisfactory results have been obtained, and in some respects it is held superior to petrol, particularly in the case of big engines, where the absence of harsh running is noticeable when paraffin is being used. Indications of the occurrence of oil have been discovered in several parts of the Union, and development is taking place, but no oil is at present produced, so that for some time at least the present high cost of imported fuel will have to be reckoned with. An alternative is, however, at hand in the form of alcohol, which could be produced under Government supervision at a very low figure. The sugar cane industry in Natal could produce large quantities, while in other districts sweet potatoes, sugar beet, banana stalks, and maize could be profitably used for this purpose. (4) In crossing rivers it is important to have good magneto and carburettor clearance. It is also a wise precaution to "case-in" the lower half of the flywheel to prevent water being thrown about when crossing a stream. It is advisable to carry the final exhaust outlet as high as possible. If this gets under water the engine soon pulls up. (5) Some method of counteracting the dangers of skidding is badly wanted, and it would appear that this can best be effected by braking all four wheels on the diagonal braking system. (6) An efficient water-cooling system is a *sine qua non*. Radiators of the built-up type, in which leaky or damaged tubes can easily be replaced, are most serviceable. In districts where water is scarce and frosts occur at night, it would be advisable to arrange that only the water from the cylinders and radiator tubes need be drawn off. (7) As regards springing, the old-fashioned method of a centre bolt and spring clips is not satisfactory. The springs break at the centre bolt, and the axles get moved out of line over rough road. This part of industrial motors requires to be completely redesigned. The usual remedy adopted, by adding additional leaves, is not satisfactory. On passenger vehicles shock absorbers seem desirable. Dealing with the vexed question of worm, bevel, or chain drive, these have all given satisfactory results. The small unsprung weight of the chain system is a distinct advantage, but this is largely counteracted by the costly renewals of chains and sprockets. It would seem that independent gear drives, as used in the new Austin lorry and the Daimler-Lanchester petrol-electric back-axle, combine the advantages of the chain and worm and avoid the disadvantages. Except for the narrow coast belt, the altitude varies from 2,000 to 6,000 ft. above sea level. It is generally found that an extra air inlet, under control, has the effect of maintaining the efficiency and power of the engines.

The author also pointed out that there is a great need for rail cars, and that the right type of vehicle has yet to be evolved. Rail motor trolleys are extensively used.

## RESOLUTIONS ADOPTED.

Resolutions were carried recommending consultation between the Government, military authorities, users, and manufacturers throughout the Empire on the subject of mechanical transport subsidy, and that a permanent Imperial Motor Transport Committee, provided with subsidies from the Governments and chambers of commerce of the Empire, should organise visits of automobile designers to the oversea dominions to obtain the data requisite for improvements in self-propelled vehicles.

## PASSENGER TRANSPORT IN CITIES.

On July 26, Mr. W. Worby Beaumont, M.Inst.C.E., dealing with "Road Passenger Transport in Cities," said: Tramways continue to be of economic usefulness, more particularly in interurban communications and in special cases where a transport service of some kind is required, but where it is not of sufficient importance to encourage the district authorities to construct well-made high roads. Where, on the other hand, traffic for tramways is or is likely to be very heavy, then as most tramways are, like railways, fixed in their termini and stopping places, they have to be worked with the limitations and requirements of the railway properly so called, and so have ceased to be either economical or suited to the requirements of most of the great cities of the older countries, where many of the streets and principal highways are barely sufficient for the conduct of the general traffic by means of vehicles which can accommodate themselves to every varying requirement for the avoidance of congestion. In considering the requirements of road-passenger transport, it is always, in the first instance, to be remembered that the relative importance of public passenger transport and of the commercial and general traffic should be the first consideration.

There are many cities, chiefly those abroad, and of somewhat modern origin, wherein are broad streets and avenues laid out at right angles, where tramway services may be conducted in respect of a considerable part of the public-service vehicle requirement, without much—or in some cases even any—disadvantage to the commercial and general traffic; but even in such cities, if there be no tramways existing to-day, the advantages and facilities offered by dirigible vehicles of one kind or another would, in the opinion of many, make it doubtful policy to put down rails for a street railway system.

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In cities such as Oxford, for example, tramways would not only be an incongruity, but a waste of money. There are on the other hand large cities, such as Glasgow, where a great manufacturing population constitutes a large proportion of the whole, wherein the tramway passenger transport reaches a higher relative importance than in many other cities where the streets and roads are chiefly required for other classes of vehicles. The fact, however, that the tramways of any city are profitable as a business concern is not alone a proof that they are economically advantageous to the community.

It is unfortunate that in some cities, and especially in London, where a very large sum has been expended on tramway systems, and, public money having been employed, the best course to be taken now is somewhat difficult to foresee. London is perhaps an extreme case, but there are other cities or towns in which the tramways have become an incubus, either by the direct proof of continuous loss on the working, or by the indirect proof of loss to the community by obstruction and damage to other vehicles. In London, for example, the falling off of receipts, the great cost of permanent way maintenance and the traffic congestion they cause, have brought to the fore the question of what is to be done in the future, and the relative importance of tramway passenger transport and of all other transport will have to be taken into consideration. It has, however, become obvious that there should be no extension of the existing lines. The tramcar does not form 2 per cent. of the vehicular traffic of Greater London: and apart from the cost of its working it probably costs the community, by obstruction to the free passage of the general traffic and by losses and damage caused by the existence of the rails and the obstructions during repairs, far more than would a rate specially levied to cover interest and redemption of the whole of the capital that now stand as the tramway debt. The daily losses fall on the whole community indirectly as the result of the increased cost of commercial and general transit and goods carriage and delivery.

The trackless trolley system of omnibus has been adopted in a few places and is proposed in others. Where the overhead wire installation is already in existence and where those concerned are chiefly interested in the sale of electric current there may appear to be some reason for inquiring into this system, although there may be little reason for adopting it when the higher capital outlay necessary as compared with the ordinary independent vehicle is considered, and when the advantages of the entirely independent vehicle are taken into account, to say nothing of the great probability of mechanical and electrical engineering advances, which may render much that would be done to-day in the establishment of the trackless trolley system obsolete.

## MOTOR TRANSPORT FOR GOODS.

Mr. W. Tetley Stephenson (lecturer on railway transport at the London School of Economics) presented a paper on "The Organisation of Motor Transport for the Carriage of Goods, and its Value to the Mercantile Life of the Community." He said: At first sight it is a matter for surprise that the progress made by motor transport for goods has been so much less than that for passengers. The explanation seems to lie in the differences in the organisation of the two systems. Shopkeepers and traders in quite a small way of business will carry out their own delivery work, even though it require but one vehicle. To replace a single horse vehicle by a motor vehicle does not admit of economy. But it is not necessary to limit the case to one vehicle. A tradesman delivering in several districts in a town may have one vehicle for each district, and may find it just as difficult to effect any economy by a change. An essential change in the organisation must be made so as to arrange for adequate loads. Unless cost of motor transport can be reduced considerably, the loads which served for horse vehicles will not be profitable for motor vehicles. The big manufacturer and the large store may adopt the simple expedient of employing one motor vehicle in place of two or more horse vehicles, all covering the same ground. For businesses of smaller dimensions—and these are the more numerous—this is not possible. The total quantity of goods that each has for a given district is too small.

The solution must lie in combination. An excellent example of this is to be found at Malvern. There the hills are so steep that the individual trader found it too costly to deliver with his own carts all over the town. So the baker's cart delivers in one street, the grocer's in a second, the butcher's in a third, and so on. In fact, half-a-dozen tradesmen combine, and by parcelling out the town amongst them effect the whole delivery at not more than half of what the cost would be if each carried out his own work single-handed. At Malvern this arrangement was made in consequence of physical conditions. It is, however, just the type of arrangement necessary to meet the new conditions imposed by motor transport. I would contrast it with some records taken in a road some weeks back. The road contains 20 occupied private houses. Its length is about 500 yards. The first half has no houses, and the major half of the houses are in the last 100 yards. On the average eight large motor vans came down the road each day; only one called at more than one house. The consignments left as a rule were quite trifling. The whole of a day's consignments would only have occupied a small corner of one van, yet four van-miles were run at a cost of some 3s., where a half van-mile would have sufficed at a cost of perhaps 6d. In many cases the cost of the half van-mile in the road must have absorbed all the profit of the trader.

In the next place a motor vehicle must cover a large delivery area, and it is of moment that this larger area be arranged so as to give in the total the smallest number of van-miles. The arrangement of delivery areas must be studied not merely from the point of view of getting good loads, but also with the view of keeping the van mileage to a minimum. The working out of the areas so as to yield the greatest economy is a complicated problem, required more attention and skill than is at present devoted to it. If this is to be effected there must be combination on an extensive scale, not only amongst traders and manufacturers, but amongst the carrying agencies. Such combination has already begun. It is well known that over most of the country the railway companies have combined their cartage staffs. Around London some of the largest road carriers have entered into arrangements parcelling out various suburban areas amongst them.

Absence of handling of goods and rapid transit for the goods are advantages on which great stress must be laid. Motor transport undoubtedly reduces the percentage of breakages. There are, of course, limits to the usefulness and economy of motor transport for goods. At present for general merchandise the limit of distance is in the neighbourhood of 50 miles, and even then there is little chance of economy unless the bulk of the distance can be made a through run with practically a full load. For low-grade goods the limit in distance would be much less, but for explosives and goods subject to very high railway rates the limit is much higher. It is, however, in the delivery work near our large towns that the greatest benefit is to be obtained. It is only when motor vans generally displace the slow horse traffic that the streets will feel the full benefit of the change.

## MOTOR CAB PROBLEMS.

A paper by Mr. E. A. Greathead, managing director of the National Motor Cab Company, expressed a strong view in favour of the limitation of licences for motor cabs. The average number of miles run by a motor cab each day was 40 miles, which expressed five hours under motion. The driver was out of the yard about ten hours, and what he was doing in the remaining five hours was not known to the owners, and the cab did not show it. At present the cab business was not really a commercial business, because the chassis was standing idle too long. The more cabs the more idle mileage, and therefore they had a strong argument for the limitation of licences.

## BRITISH POSTAL MOTORS.

"The Use of Motor Transport by the Post Office within the British Islands" was dealt with by Mr. Walter G. Gates (assistant secretary to the Post Office). In concluding he said: It is perhaps impracticable to ascertain whether the use of motor transport by the Post Office for the conveyance of mails has resulted in an increase or a decrease in expenditure. Generally speaking, where there is a heavy load and where the distance to be travelled is considerable, motor traction is not only more efficient but more economical than horse traction. But where the load is light and where there are long intervals between journeys, there is difficulty in arranging any economical method of motor traction, especially if the distance to be travelled is at all short. £138,821 per year is now being paid for the conveyance of mails by motor vehicles, and this sum is about 20 per cent. of the total expenditure for the conveyance of mails by road within the British Islands. The following figures may prove of interest:

Conveyance of Mails by Road.

Vehicles appropriated to mails only:

| | No. of Services. | Total Annual Mileage. | Total Annual Cost. |
|---|---|---|---|
| | | | £ |
| England and Wales ... ... ... | 103 | 3,175,113 | 121,674 |
| Scotland ... ... ... ... ... | 6 | 90,051 | 3,228 |
| Ireland ... ... ... ... ... | 3 | 73,664 | 2,380 |
| Totals ... ... | 112 | 3,338,828 | 127,282 |

Vehicles run as passenger vehicles, and taken advantage of for mails:

| | No. of Services. | Total Annual Mileage. | Total Annual Cost. |
|---|---|---|---|
| | | | £ |
| England and Wales ... ... ... | 6 | 50,587 | 1,721 |
| Scotland ... ... ... ... ... | 42 | 441,756 | 7,300 |
| Ireland ... ... ... ... ... | 3 | 84,643 | 1,310 |
| Totals ... .. | 51 | 576,986 | 10,331 |



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Vehicles of a lighter type, such as cycle cars, side cars, or bicycles:

| | No. of Services. | Total Annual Mileage. | Total Annual Cost. |
|---|---|---|---|
| | | | £ |
| England and Wales ... ... ... | 7 | 87,165 | 1,112 |
| Scotland ... ... ... ... ... | — | — | — |
| Ireland ... ... ... ... ... | 1 | 8,112 | 96 |
| Totals ... ... | 8 | 95,277 | 1,208 |

## POSTAL MOTOR SERVICES.

Mr. G. HAMILTON-GRAPES (delegate representing the Postmaster-General of the Dominion of New Zealand) gave a brief survey of the present conditions of the various self-propelled vehicle services installed for postal work as he found them during his recent inspection for the Government of New Zealand of the motor postal services in New South Wales, Victoria, Tasmania, South Australia, Western Australia, Italy, Austria, Hungary, Germany, France, and Great Britain. He concluded: I am compelled to admit that progress has not been made in this branch of public service motor work commensurate with the improvement that has taken place in the purely civilian commercial sphere of the movement during the past few years. These services may be taken as a whole as unsatisfactory from a financial standpoint to the actual operators. From the aspect of greater efficiency in actual handling of mail matter they are an unqualified success. The same factors that govern the problem of all-round success in other spheres of commercial motor work demand attention equally in postal affairs. It is solely due to their non-recognition by the interested principals that so much mechanical trouble has been and is experienced. I have found in all countries since my first inspection for the New Zealand Government in 1908, the same costly experiments being repeated again and again. Each State ignores past experiences and mistakes made by others which have tried out the transportation of mail matter by motor vehicle.

The British of the Empire are as much at fault here as other nations. This is deplorable, as the utilisation of the motor vehicle for postal work is comparatively in its infancy, and a vast field awaits the advent of a suitable light four-wheeled machine for the collection of letters from the pillar boxes, handling express parcel post and registered mail matter. The search for this machine has been the objective of my recent tour. There should be no insurmountable difficulty in solving this problem, and in my opinion it can best be met by following out in miniature the lines of the tried-out taxi-cab chassis. An outline specification of such a machine would involve a four-cylinder water-cooled engine, furnishing 10-H.P. at 1,000 revolutions per minute, the total weight complete not to exceed 75 lb. per brake-horse-power. The Hungarian postal authorities have solved this question, and placed an order for 200 machines. The Governments of Italy, Austria, and France are now engaged in searching for similar machines designed and manufactured in their own countries. The remedy for the evils which exist to-day would, in my opinion, be found to consist in giving effect to the following conditions: All contract work to be for terms of not longer than five years; all State-owned fleets to be controlled by qualified motor experts; the fitment of lighter bodies; reduction of speed in the heavy vehicle class; larger wheels for all work except severe gradients; heavier sectioned tyres; discontinuance of the present practice of overloading; one man, one machine, which would also embrace ample vehicle reserve, and full time for inspection and timely repairs.

## THE RECORDS OF A MUNICIPAL MOTOR OMNIBUS UNDERTAKING.

Mr. P. ELLISON (general manager and engineer of the County Borough of Eastbourne Motor Omnibus Department), in a paper bearing the above title, said, in connection with the motor omnibus movement, Eastbourne claims considerable distinction, inasmuch as its public passenger transport is handled solely by motor omnibuses. The population when the motor 'buses were started in 1903 was about 40,000, and it is now about 52,000. Motor 'buses were adopted because it was felt that they would not affect the beauties of the town as would a tramway service. The hopes which were entertained when motor omnibuses were adopted have been fully realised. The class both of visitor and resident has been fully maintained. The road surfaces are as good as ever they were; local feeling is appreciative of the omnibuses; the lucrative summer season has increased in length, and the winter season is growing in importance. Moreover, it has been found possible to provide services which work at a profit without very heavy capital outlay, and without charging unduly high fares.

The department was formed in 1902, four vehicles being operated. Two more were added in 1903, two in 1904, two in 1905, four in 1906, four in 1907, three in 1908, nine in 1910, and two in 1912. Of these, 12 have been Milnes-Daimler vehicles, 16 De Dions (of which 12 were purchased second-hand), two of the old type of Clarkson steam omnibus, and two—the most recent purchases—the modern type of Leyland omnibus. Some of the earliest units of the fleet dropped out of action in a few years, but out of the first four Milnes-Daimlers two are now working for the highways department, while two more are being converted into water carts. There are 20 omnibuses in regular service. A year after the department was formed three routes were operated by six vehicles and about 12 men. In 1913 eight routes are operated by 20 vehicles, and the number of men amounts to 82. Repairs are carried out in the department's own works. The majority of the vehicles when not on the road are accommodated in a depot constructed comparatively recently.

Attached to this paper I have set out the costs of operating the vehicles from 1905, when full records were first made available, until the end of March of this year. The number of passengers carried increased regularly from 1905 until 1912, but the last financial year showed a drop in the number, due to the bad weather in the summer of 1912. The financial results have been of late very satisfactory. There were losses amounting in 1905 to about £295, in 1906 about £318, and in 1907 about £252. It was near the end of 1906 that the writer took over the management. Since that date profit has been shown on the working for each year. For 1908 the net profit was £50. The next year saw a drop of £250, but in 1910 there was a satisfactory balance of £660. In 1908 three second-hand 'buses were purchased, and in 1910 no less than nine second-hand vehicles were bought at a cost of little over £200 apiece. Many of these cars required expensive overhauls before they became satisfactory units of the fleet, and it also became advisable at about the same time to make somewhat extensive alterations in the transmission of some of the older cars. In view of these considerable expenses for 1911, the figure of net profit fell to about £41, and for 1912 was only about £105. By the beginning of the last financial year most of this expensive work had been completed, and the result for the twelve months terminating at the end of last March was a net profit of £711, the highest yet obtained in any one year's work. This year also indicated the increasing popularity of the omnibuses, by a rise in the receipts per mile run.

In judging the results obtained by the figures of cost per mile, due regard should be had to the fact that winter services are operated at a loss in the interests of the permanent residents. Also, the summer trade is very greatly in excess of the winter trade, on account mainly of the large number of visitors. This means that the number of 'buses required for the summer is much in excess of the number that can be kept regularly in employment during the winter.

### ECONOMY OF WORKING WITH MODERN VEHICLES.

The figures of cost appear to show an upward tendency since 1905. At that time the vehicles were comparatively new, whereas now, all, with the exception of two, are of old design, and have covered a very considerable mileage since they were first put upon the road. In the opinion of the writer the allowance made for depreciation in the early days was insufficient, and a substantial increase in this allowance caused an apparent rise in the figures of cost from 1907 onwards. The introduction of a number of second-hand vehicles also tended to put the figures up. Were the department operated by a company, the amount charged for interest and repayment of loans would be available for dividend. Of late considerable sums have been spent on the purchase of additional vehicles out of revenue. The loans negotiated for the purchase of 'buses have been repaid, with the exception of about £4,000; the sum owing upon buildings amounts to about £6,000. Consequently, it may be said that the capital at present involved is some £10,000, so that it will be seen that the net profit of the past year, after interest has been paid on capital at the rate of about 4 per cent., would indicate substantial dividends for a company.

If the whole of the fleet were comparable with the two new vehicles added during the last 12 months, the total cost of operation, including all charges, would approximate to 10d. per car-mile. Separate accounts have been kept for the new cars, which have covered some 14,000 miles each, and it is found that petrol, wages, cleaning, maintenance, lubricants, stores, and spare parts, work out at about 3·75d. per mile. The suggested figure of 10d., inclusive of interest and repayment of loans, would no doubt rise slightly as the 'buses grew older and renewals became necessary. It would, however, never approximate to the present cost. To take one example only to illustrate this point, it may be mentioned that the renewal of wearing parts in the final drive of one of the older vehicles involves an expenditure of £15 every three months. A reliable estimate for corresponding parts of the cars of more recent design puts the cost at £16, these parts lasting more than 12 months, so that this item alone shows a saving of approximately £50 per car per year, which saving would continue throughout the life of the vehicles. At the present

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moment, the estimated value of the fleet is considerably in excess of the loan outstanding, and the department is reported by the borough accountant to be in a very strong position.

Attention should be called to the anomaly that the department makes a considerable annual payment, through the medium of the petrol tax, to the funds of the Road Board, these funds being employed for road improvement throughout the British Isles. It seems unreasonable that a national contribution should be made in connection with work that is purely in the nature of local service. The services have been maintained with a satisfactory degree of safety to the passengers, and also to other users of the roads.

NINE YEARS' OPERATING COSTS.

| | Year ending March 31, 1905. Miles run, 140,194. | Year ending March 31, 1906. Miles run, 152,733. | Year ending March 31, 1907. Miles run, 153,474. | Year ending March 31, 1908. Miles run, 196,335. | Year ending March 31, 1909. Miles run, 190,463 | Year ending March 31, 1910. | Year ending March 31, 1911. | Year ending March 31, 1912. | Year ending March 31, 1913. |
|---|---|---|---|---|---|---|---|---|---|
| | Cost per Car-Mile Run. | | | | | | | | |
| EXPENDITURE: | | | | | | | | | |
| Running ... ... ... | 7·14 | 7·37 | 8·56 | 6·91 | 7·02 | 6·83 | 6·6 | 6·81 | 6·92 |
| Repairs and maintenance | 1·57 | 2·38 | 1·66 | 1·58 | 2·48 | 2·97 | 2·6 | 3·75 | 3·21 |
| Depot ... ... ... | ·31 | ·26 | ·23 | ·18 | ·21 | ·27 | ·23 | ·22 | ·19 |
| Management ... ... | ·33 | ·35 | ·5 | ·53 | ·66 | ·64 | ·6 | ·69 | ·76 |
| General expenses ... | ·07 | ·11 | ·15 | ·06 | ·04 | ·04 | ·04 | ·05 | ·06 |
| Interest and repayment of loans ... ... ... | 1·24 | 1·74 | 2·22 | 2·48 | 2·44 | 2·21 | 2·17 | 2·29 | 2·30 |
| Instalments on 'buses purchased out of revenue... | — | — | — | ·29 | ·24 | ·31 | ·67 | ·58 | ·95 |
| | 10·66 | 12·21 | 13·32 | 12·03 | 13·09 | 13·27 | 12·91 | 14·39 | 14·39 |
| INCOME: | | | | | | | | | |
| Passengers... ... ... | 10·28 | 12·35 | 12·57 | 12·18 | 12·93 | 13·17 | 12·38 | 13·79 | 14·23 |
| General ... ... ... | ·08 | ·14 | ·36 | ·53 | ·47 | ·86 | ·57 | ·71 | ·93 |
| | 10·36 | 12·49 | 12·93 | 12·71 | 13·4 | 14·03 | 12·95 | 14·4 | 15·16 |

## THE COMMITTEE TO REMAIN IN OFFICE.

In the general discussion Mr. J. W. DUGDALE (Oldham Corporation tramways manager) criticised Mr. Ellison's figures.

Mr. R. DUNCAN (South Australia) said he would be asked on his return whether the tests in different countries were similar and held under similar conditions. Before he came to England he considered that, in Australia, they had good and bad roads; now he considered they had bad roads and worse. The sand out there is awful, and vehicles are overloaded.

Sir JOHN H. A. MACDONALD (Scottish Automobile Club) said he was glad to hear how good our roads were. The question of good roads should be taken up universally, as thereby the cost of running motor vehicles would be lowered. With smooth roads tram rails were not wanted on top of them. The day of the tramway, he thought, was over, and that no more of them would be laid down in large towns.

Colonel R. E. CROMPTON said that the streets of London were safer now than at any other time owing to the education of 30,000 drivers by the Commercial Motor Union. The pedestrian showed the least consideration of all. Children should be educated how best to avoid road traffic.

A delegate from British Columbia suggested that co-operation would do away with some of the trouble at present attending road transport.

Mr. F. CHURCHILL (J. and E. Hall, Limited) said that chain drive was best for rough work, while the speed could be more easily varied. The War Office having refused chain drives, the Colonies will follow suit to their disadvantage. The whole of the remainder of the War Office "subsidy" specification could be followed with the chain drive, and it should, therefore, be moved to modify this rule.

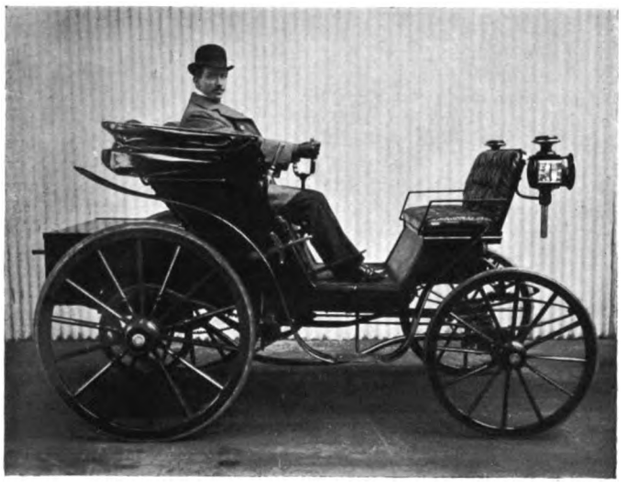
Colonel CROMPTON considered this a most important point, and suggested an adjourned discussion.

On the motion of Mr. H. G. HUNTLEY (South Africa), it was decided to ask the Executive Committee to remain in being with a view to their adopting a permanent constitution, linked up with the Dominions.

During the week visits were paid to Brooklands automobile racing track, the London Aerodrome at Hendon, and Windsor Castle. For the latter visit the London General Omnibus Company placed 24 omnibuses at the disposal of the party. The trip through many picturesque portions of the Thames Valley gave a good idea of the efficiency of the motor omnibus as a means of conveyance into the country for town dwellers. On another occasion the London General Omnibus Company conveyed the delegates for an inspection of London traffic and of Willesden Green garage, one of the 34 establishments of the kind owned by the company. Statistics were shown which proved that the amount of mileage lost on an average by one motor 'bus in a month is from 3 to 3½ miles, this including anything unforeseen which keeps the vehicle at a standstill. On July 25 Thomas Tilling, Limited, supplied a number of their petrol-electric omnibuses, and conveyed the visitors to the General Motor Cab Company's garage, and the mail van depot of Thomas Tilling, Limited.

## MR. SIDNEY STRAKER.

Mr. Sidney Straker, whose portrait appears on page 142, is the present chairman of the Commercial Vehicle Committee, and to him was due in a large measure the success of the Motor Vehicle Exhibition at Olympia, the arrangements for which were in the hands of the committee. Mr. Straker is one of the pioneers of the motor industry. He designed and built his first motor car in 1897 (the accompanying illustration is reproduced from a photograph taken in June of that year), and from that time onward he has been a moving spirit in the trade, and has worked vigorously and successfully in the interest of the whole industry. He was one of the founders of the Royal Automobile Club, and for many years a member of its committee of management. Mr. Straker was early identified with the policy which had for its object



**Straker Motor Car Built in 1897.**

the popularisation of the motor car, and in conjunction with the Hon. Arthur Stanley was mainly responsible for the inauguration of the series of annual exhibitions at Olympia which not only placed the society in a sound financial position, thereby enabling it to undertake a number of onerous duties for the general welfare of its members, but created a demand for motor cars which has developed with such remarkable rapidity. Mr. Straker was largely instrumental in bringing the R.A.C. and the S.M. & T.A. together in order that the full benefit of the exhibition policy should be enjoyed by the manufacturers.

Mr. Straker was president of the Society of Manufacturers and Traders for three years in succession, viz., 1904-5, 1905-6, 1906-7. He is an associate member of the Institution of Civil Engineers, and a member of the Institution of Mechanical Engineers.

## KEIGHLEY OMNIBUS RESULTS.

In presenting the accounts of the tramway and motor 'bus undertakings for the year ended March 31, Councillor A. Smith, on July 22, stated that there was a decrease in revenue of £742 owing to the bad summer and the giving of cheaper facilities—2½ miles for a penny. The gross profit on the tramways was £9,158. Better results had been achieved this year in the motor omnibus department, the working expenses having been met and a slight balance remaining towards interest and sinking fund. The result had, he thought, proved that the committee were wise not to discontinue the service entirely, as the tramways would lose the traffic for the cars which was now induced by the 'buses. The cost per mile worked out at 1s. 4d., while the income was slightly under 1s. 0½d. Last year £1,103 was transferred to the loss on the 'buses from the net profit of the tramways, but this year only £368 had been transferred, so that the actual improvement on the working of the 'buses equalled £1,133.

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# MOTOR TRAFFIC.

The experimental railless trolley cars which had been running since May 3 last had created a favourable impression. From that date to July 14 the car had covered 2,126 miles, and the revenue equalled 12·54d. per mile—a slightly better revenue than that received on the 'buses during the past twelve months' working. The operating costs were well within the estimate given, and the wear on the tyres would be only one-fourth of the wear on the omnibus tyres.

## MOTOR TRAFFIC NOTES.

Brighton, Hove, and Preston Omnibus Company.—The board have declared an interim dividend of 3¾ per cent. (3s. per share), free of income tax, on the ordinary shares for the half-year.

Nu eaton's Transit Requirements.—The Nuneaton Co-operative Society have urged upon the Town Council the necessity for providing a tramway or motor 'bus service for the town and district.

Competition and Halfpenny Fares.—The short halfpenny stages on the Hackney and Clapton routes of the London County Council Tramways have been extended to correspond with those given on the omnibuses.

Electric Vehicles for Postal Service.—In Vienna 30 electric vans have been placed in service on 15 postal parcel delivery routes. It is estimated that during the year the vans will cover 496,000 km., making 182,000 journeys.

A Petrol Tramcar for Stirling.—Subject to the consent of the local authorities being given, the Board of Trade have authorised the use, as an experiment, of a petrol-propelled tramcar on the system of the Stirling and Bridge of Allan Tramways Company.

Dry Seat Problem on Omnibuses.—The London General Omnibus Company, Limited, are asking for suggestions for making the tops of the omnibuses comfortable and pleasant to travel on under any weather conditions. A roof is impossible, and the present arrangement of mackintosh aprons is quite unsatisfactory.

Opening for a Motor Service in Wales.—It was suggested, at a meeting held at Bridgend to consider the inadequate train service of the Great Western Railway between Bridgend and the Llynfi, Ogmore, and Garw Valleys and Kenfig Hill, that a motor road service should be established between Bridgend and Kenfig Hill.

All-night Omnibuses in London.—The London General Omnibus Company on July 14 instituted an all-night service between Cricklewood, N.W., and Liverpool Street, touching the principal points of night business and traffic in the metropolis. That the facility is required, has been proved by the patronage received, while requests for similar services have been received from other districts.

A Matter for Omnibus Companies.—At an inquiry held on July 10 into the death of a tramway employee who was killed by a motor omnibus at Streatham while passing between that vehicle, a tramcar, and a cyclist, the jury returned a verdict of accidental death, and added the rider: "We desire to add that the practice of motor 'bus drivers selecting the same stopping places as the tramcars is a source of public danger, and in our opinion was the chief cause of this fatal accident."

Steam Omnibus for Liverpool Juries.—Liverpool Corporation Tramways have obtained from the National Steam Car Company, Limited, of Moulsham Works, Chelmsford, a steam chassis of the maker's standard 32-h.p. type. Leaving London at 5 a.m. on July 23, the chassis travelled to Liverpool under its own steam, arriving at 7 p.m., after covering a distance of 210 miles. Mr. Clarkson accompanied the chassis. An omnibus body will be erected on this chassis at the Lambeth Road car works of the Liverpool Corporation, and the vehicle is to be used for the accommodation of the city coroner's juries.

Southend and Omnibuses.—Report was made to the July meeting of the Council that arrangements had been made for the proposed purchase of omnibuses by the Corporation to be cancelled, and that in respect of such cancellation the Corporation should pay Messrs. Stevens and Company £100 in discharge. The town clerk reported that at the direction of the chairman of the Tramways Committee he had acknowledged Messrs. Stevens' courtesy in dealing with the matter, and to state that their firm would have favourable consideration in case the Corporation required omnibuses in the future, although the Corporation must necessarily in such case be quite free to go into the market. The Council approved of the action of the committee.

Popularity of Omnibuses in Croydon.—Commenting upon the debate on the Tramways Committee's annual report for the past year, during which period motor omnibus competition was inaugurated, the *Croydon Guardian* says: "If the public could only be prevailed upon to use the tramcars in preference to the 'buses, where both are in competition, the tramways chairman's optimism would probably prove to be well founded. But the way in which the public flock to the 'buses after repeated counsel to the contrary would seem to show they are for nothing so much as the making of a whip to be used upon their own backs." The same journal observes that the tramway facilities for which the South Norwood and Addiscombe Ratepayers' Associations asked are now being supplied by the 'buses.

Paraffin as Motor Fuel.—A demonstration of the Southey oil gas producer was recently given at the works of Commercial Cars, Limited, at Luton. Hitherto attempts to use paraffin as a motor fuel have been in the form of vaporisers which either entail the use of high-grade oil or the separate use of petrol for the purpose of starting the engine. The Southey oil gas producer is not a vaporiser and requires no petrol even for starting from the cold, it can be fitted to any type of internal combustion engine without any alteration to any part of the engine, and the engine can be started up in exactly the same manner as when running on petrol. Moreover, the cheapest grade of oil can be used and the consumption is no higher than that of petrol costing from two to three times the price. The demonstration was a complete success.

Motor Tyre Litigation.—At the West Riding Assizes on July 15 J. W. and T. Connolly, Limited, tyre manufacturers, London, sued Henry W. Heaps, motor carrier, of Darwen, for money alleged to be due under an agreement for the hire of motor tyres. Mr. Justice Rowlatt decided that there was no answer to the action. Defendant hired the tyres by agreement, one of the terms of which was that plaintiffs might turn him into a purchaser at 25 per cent. discount if he broke any clause of the agreement. One of the things he undertook to do—it was a severe burden—was to make absolutely accurate returns, and to do that he ought to have provided himself with a mileometer. He did make erroneous returns, and he must, therefore, accept the consequences of the agreement. There would be judgment for the amount claimed, £192.

Railless Traction and Road Repair.—At a meeting of the West Riding of Yorkshire County Council on July 9, Ald. Crossley, in moving the report of the Law and Parliamentary Committee, commented upon the decision of the committee to oppose the Mexborough and Swinton Railless Traction Bill. He remarked that the position with regard to the upkeep of main roads was most unsatisfactory. An estimated cost of £2,500 a mile would have to be incurred for putting the road into such a state as would fit it to carry the extra traffic. It seemed unreasonable to call upon a community to go to such expense. They had also to ascertain what should be paid for damage done in the ordinary way by trolley vehicles. The greatest sum had been one halfpenny per car-mile, but three-eighths of a penny was the sum generally accepted. That was unreasonable, and was much under the actual cost of the damage done.

Competition in Oldham.—The Tramways Committee have discussed the question of carrying passengers on the initial and last journeys of the motor omnibuses from the depot to Moorside and back. It was proposed to allow the public to travel for a sixpenny fare, but several members contended that the 'buses would not secure passengers at that fare, and the chairman stated that the committee did not want to rob the tramway service. The manager explained that people paid 2d., 3d., and 4d. to ride in wagonettes from Moorside to Grains Bar and that while the motor 'buses were running. If the committee charged the ordinary car fare people would hang back for the motors, and the cars would be running empty, because there was no scheduled time for starting. The committee decided to charge 3d. and 6d. fares. The committee decided to purchase a third omnibus, which is to be fitted with the latest type of mud-guard, coming low down, to prevent splashing.

Petrol-Electric Motor Fire Appliances for London.—The Fire Brigade Committee of the London County Council on July 22 reported to the Council they were advised that petrol-electric motor appliances suitable for the purposes of the Fire Brigade could not be obtained in this country, and they recommended the acceptance of the following offers for additional appliances of that kind: Magirus, Ewald, und Lieb, of Ulm, to supply two Magirus ladders, to fit the ladders to Braun chassis, and to deliver the complete appliances in London for the sum of £1,300, including extras; J. C. Braun, Premier Werke, A.-G., Nürnberg, to supply at the works of Magirus, Ewald, und Lieb two petrol-electric chassis for fitting to Magirus ladders for the sum of £2,222; J. C. Braun, to construct and deliver in London a petrol-electric chassis for an escape van for the sum of £930. The work of completing the escape is proposed to be carried out at a cost of £150 by the Fire Brigade Committee.—On July 29 the Council agreed to the recommendation with the addition that the contractors be required to sign a fair wages clause, and that the carrying out of such condition be insisted on by the Council.

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THE

# Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### COUNTY BOROUGH OF BLACKPOOL.

TRAMWAYS DEPARTMENT.

WATERPROOF CLOTHING.

Tenders are invited for the supply and delivery of Waterproof Clothing required for Traffic Staff for the ensuing two years. Form of tender may be obtained on application to the undersigned.

Tenders, in sealed envelopes, endorsed "Waterproof Clothing," addressed to the Chairman of the Tramways and Electricity Committee, Electricity Works, West Caroline Street, Blackpool, and to be received not later than Wednesday, August 20, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

CHARLES FURNESS,
Borough Electrical Engineer
and Tramways General Manager.

General Offices, West Caroline Street, Blackpool,
August 7, 1913.

### EAST INDIAN RAILWAY.

The East Indian Railway Company is prepared to receive tenders for the supply and delivery of:—

(1) Brass and Copper Tubes.
(2) Leather Belting, Butts, etc.
(3) Galvanised Straining Bolts and Strand Wire for Fencing.
(4) Red and White Lead.
(5) Bolts, Nuts, Rivets, etc.
(6) Copper Ingots,

as per specification to be seen at the Company's Offices.

Tenders are to be sent to the undersigned, marked "Tender for Brass, etc., Tubes," or as the case may be, not later than 11 o'clock a.m. on Wednesday, the 27th day of August instant.

The Company reserves to itself the right to divide the order, also to decline any tender without assigning a reason, and does not bind itself to accept the lowest or any tender.

For each specification a fee of £1 1s. is charged, which cannot under any circumstances be returned.

By order, C. W. YOUNG,
Secretary.

Nicholas Lane, London, E.C.,
August 14, 1913.

### H.H. THE NIZAM'S GUARANTEED STATE RAILWAY COMPANY, LTD.

The Directors of H.H. the Nizam's Guaranteed State Railways Company, Limited, are prepared to receive tenders for the supply of Steel Material (Flats, Sheets, Rounds, etc.).

Tenders should be addressed to the undersigned, and delivered on Friday, August 22, 1913, marked "Tender for Steel Material."

Specifications are obtainable at the Company's Offices on payment of ten shillings each.

The Company is not bound to accept the lowest or any tender.

By order, M. T. WALKER,
Secretary.

Company's Offices, Winchester House,
Old Broad Street, London, E.C.,
August 13, 1913.

### CITY OF DUBLIN.

ELECTRICITY SUPPLY.

The Electricity Supply Committee of the Corporation of the City of Dublin are prepared to receive tenders for the supply of the following:—

Alternating Current Meters, Single Phase.
" " " Three Phase.

for a period of two years.

Specification, with terms and conditions and form of tender, may be inspected at the office of the City Electrical Engineer, Fleet Street, Dublin, on and after August 8, 1913, and may be obtained from the latter on payment of £1 1s. od., which sum will be refunded on the return of the specification, filled up, with a *bona fide* tender.

Tenders (sealed and marked "Tender for Electricity Meters") must be addressed to "The Chairman, Electricity Supply Committee, 3, Cork Hill, Dublin," and be delivered not later than 12 o'clock noon on August 26, 1913.

Each tender must contain the names of two sureties who will be prepared to execute a joint and several bond for the due performance of the contract in a sum of 20 per cent. of the contract price.

The Committee do not bind themselves to accept the lowest or any tender, and the contract will be subject to ratification by the Municipal Council.

FRED J. ALLAN,
Secretary.

Electricity Supply Committee's Offices,
Cork Hill, Dublin, August, 1913.

### COUNTY BOROUGH OF ROTHERHAM.

MOTOR FIRE ENGINE.

The Watch and Fire Brigade Committee of the Rotherham Corporation invite tenders for the supply of a 400-gallon Turbine Motor Fire Engine of 60 h.p., with 40ft. Extension Ladder.

Persons or firms tendering must furnish with their tender full specification, drawings, and detailed particulars with respect to the engine proposed to be supplied by them. The firm whose tender is accepted will be required to enter into a contract which will contain the Fair Contracts Clause.

Tenders, endorsed "Motor Fire Engine," to be sent to me not later than the 1st September next.

The Corporation do not bind themselves to accept the lowest or any tender.

CHAS. L. DES FORGES,
Town Clerk.

Town Hall, Rotherham,
August 13, 1913.

## POSITIONS VACANT.

### MALVERN URBAN DISTRICT COUNCIL.

GAS MANAGER AND ELECTRICAL ENGINEER.

The above Council invite applications for the position of Gas Manager and Electrical Engineer.

The person appointed will be required to devote his whole time to the duties of the office, and to carry out such duties as shall from time to time be assigned to him.

The salary will be at the rate of £350 per annum, rising to £400.

Applications, endorsed "Gas Manager and Electrical Engineer," must reach the Chairman of the Council, Council Offices, Malvern, not later than Saturday, August 30, 1913.

Forms of application may be obtained from the undersigned.

Any candidate is at liberty to forward me 20 copies of his application and three recent testimonials (but of nothing else whatever) in stamped envelopes for transmission to the members of the Council.

Canvassing in any form whatever will be a disqualification. This rule will be strictly adhered to.

Dated this 2nd day of August, 1913.

H. L. WHATLEY,
Clerk to the Council.

Council Offices, Malvern.

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### MUNICIPALITY OF SOMERSET WEST, STRAND, SOUTH AFRICA.

ENGINEER WANTED.

Applications are invited for the position of Engineer to the Council.

Applicants must also be fully qualified and competent to make the necessary surveys and estimates, draw plans and generally supervise and carry out a drainage scheme for the municipality. Applicants to state inclusive salary expected, and earliest date upon which duties could be commenced. Applications, with testimonials and past experience, addressed to the Town Clerk, Somerset Strand, Cape Province, Union of South Africa, to be in not later than September 17 next. Applicants may also communicate with H. A. Fagan, 25, St. George's Square, London, N.W.

### WALSALL CORPORATION TRAMWAYS.

CHIEF CLERK.

Applications are invited for the above position. Candidates must be experienced in book-keeping and accountancy, and have a good knowledge of a tramway ticket system.

Salary £130 per annum, rising by annual increments of £10 to £160.

Applications, stating experience and qualifications with copies of testimonials, must be sent in not later than Saturday, the 30th inst., and addressed to the undersigned.

R. L. Horsfield,
General Manager.

Birchills Depôt, Walsall,
August 13, 1913.

### STATISTICAL CLERK.

Statistical Clerk required at once. Must have sound mathematical knowledge and ability to apply same in practice. Preference given to men accustomed to the routine of schedules, preparation in connection with the working of trains, trams, etc. Write, giving full particulars, etc., to Box 4179, Willings, 125, Strand, W.C.

### MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The Annual Conference of the Municipal Tramways Association will be held at Sheffield on Wednesday, September 24, Thursday, 25, and Friday, 26.

### WANTED.

Copies of The Tramway and Railway World for September, 1906, October, 1907, and October, 1908. Apply to the Publishers, Amberley House, Norfolk Street, Strand, London, W.C.

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SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 21, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

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MOORGATE STREET, LONDON, E.C.

## THE MOTOR TRAFFIC REPORT.

In this issue we publish an abstract of the report of the Select Committee of the House of Commons on motor traffic in London. The subject is of interest to those concerned in traffic problems in all large centres of population in the country, though the troubles in the metropolitan area differ both in degree and in kind from those encountered elsewhere. It is true that the report of the Committee bears traces of haste in preparation; it had to be issued by the end of the session, and publication was achieved only on Thursday, while the session closed yesterday. All the same, the report is of great value in two aspects. One of these is the great amount of traffic information which it contains, including statistics as to accidents, and the other is the valuable nature of many of the recommendations. The need for such an inquiry may be judged from the fact, apart from anything else, that the number of street accidents has increased more than threefold in eight years, and that the motor omnibus record in accidents is most unsatisfactory. Among the recommendations to which whole-hearted assent may be given are that one Government Department only (instead of three as at present) should advise Parliament on London traffic, that the borough councils' veto on new tramway schemes should be abolished, and that closer control of traffic should be exercised by the police. But the blot on the whole report is the recommendation that the county councils in the metropolitan police area should formulate by-laws for regulating traffic, subject to an appeal to a new traffic branch of the Board of Trade, which is to be the Department advising Parliament. If the county councils had confined themselves to their administrative work, they would no doubt have been admirable bodies for making traffic by-laws and regulating and defining omnibus routes. But the two most important county councils concerned, those of London and Middlesex, are in the business as owners of tramways. Even with the power of appeal, great trouble would arise when the county councils began to dictate to the omnibus companies, for such an arrangement would always tend to help the tramways and prejudice the omnibuses. Omnibus traffic has bad features, but at present it is indispensable in districts where there are no tramways. The omnibus companies have an issued capital of nearly five millions, and their interests should be protected. It may be well that there should be a restriction of omnibus working along tramway routes, but the body to impose the restriction should not be the body owning the tramways. No solution of the case is satisfactory over all, except the old one proposed eight years ago by the Royal Commission on London Traffic—namely, the creation of a Traffic Board for London. A powerful, impartial expert body is required to look after all phases of London traffic, and to devise new schemes to meet growing needs.

## LONDON TRAFFIC REGULATION.

### REPORT OF THE SELECT COMMITTEE.

The report of the Select Committee, which was originally appointed by the Government on November 27, 1912, was issued on Thursday. Their principal recommendation is that a new Traffic Branch of the Board of Trade be set up as a Traffic Board to advise Parliament in all Metropolitan traffic matters.

**RECOMMENDATIONS.**

The Committee's own summary of its proposals is given in full below:—

(1) That in all Metropolitan traffic matters Parliament should be advised by one Department, which should combine the traffic duties of the Home Office, the Local Government Board, and the Board of Trade, including the confirming of by-laws.
(2) That a new Traffic Branch of the Board of Trade be set up to perform the above and other duties.
(3) That the veto of Borough Councils in regard to Tramway schemes be replaced by a full hearing before the new Traffic Branch, which shall report to Parliament. That Standing Order 22 be revised.
(4) That County Councils in the Metropolitan area should have the widest possible by-law-making powers, subject to confirmation by the new Traffic Branch of the Board of Trade.
(5) That all mechanical stage carriages and hackney carriages be brought under closer control; that the routes, time-tables, and number of stage carriages be subject to County Council Regulations confirmed by the new Traffic Branch of the Board of Trade, with a right to local authorities and other interested parties to be heard, such right to extend to any decision of a Council relating to these matters, or the refusal or neglect of any Council to take action when requested to do so; that the design of mechanical stage carriages be subject to the new Traffic Branch, which should have independent expert advice.
(6) That the licensing of stage carriages and hackney carriages be a duty of County Councils and County Borough Councils, subject to a right of appeal to the new Traffic Branch.
(7) That special speed limits for motor omnibuses and other heavy motor traffic be imposed where conditions are especially dangerous.
(8) That closer control of traffic be exercised by the police.
(9) That traffic points be fixed at a greater number of crossings.
(10) That more refuges be provided.
(11) That so soon as practicable means be taken to remove the congestion caused by dead ends of tramways, street markets, and roadway obstructions.
(12) That the measures already taken through the schools to warn children and parents as to street dangers should be continued and extended.
(13) That suggestions as to amendments of the law and other matters mentioned in the report be carried into effect.

The report, which is of much interest, is issued in the form of a "White Paper," and covers 42 pages, of which we can give only a brief summary:—

**POINTS FROM THE REPORT.**

The reason for the appointment of the Committee was the increasing number of fatal accidents in the metropolis, due to motor omnibuses and other forms of power-driven vehicles. In pursuing this inquiry, the Committee held 42 sittings and examined 54 witnesses. They found it impracticable to consider the question of safety separately from the general traffic problem of London. Referring to the Royal Commission on London Traffic, which reported in 1905, the Committee observed that many of their recommendations, if carried out, would have tended in the direction of public safety, and most of those recommendations have only become more urgent in the time elapsed since they were made. The changes which have taken place since 1905 are due to the development of mechanical traction, as will be seen from the statistics appended:—

| | Horse Cabs. | Horse Omnibuses and Tramcars. | Electric Cars and Motor Omnibuses. | Motor Cabs. |
|---|---|---|---|---|
| 1907 ... ... | 9,818 | 2,961 | 2,973 | Nil. |
| 1912 ... ... | 2,385 | Nil. | 5,767 | 8,000 |

The difficulties described in the report of the Royal Commission

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have been intensified by this change. The development of the inward and outward current of travel is shown by the following figures:—In 1904 the journeys taken per head of population amounted to 150, and this figure has increased to 228 per head. The total numbers for 1911 are:—

| | |
|---|---|
| Tramway passengers ... ... ... ... | 821,819,741 |
| Omnibus passengers ... ... ... ... | 400,628,487 |
| Local railway passengers ... ... ... | 436,398,745 |
| Trunk railway passengers from a 30 mile limit | 250,000,000 |
| | 1,908,846,973 |

The daily increase is not less than 250,000, and by 1920 it is estimated that the number of journeys will exceed 3,000,000,000. During the last three years the fatalities have increased enormously, and the amplification of the traffic has outgrown the methods for dealing with it. A dictator for half a dozen years would have a difficult task, owing to the inherent physical obstacles he would have to encounter. In London such a solution is, of course, impossible, and the Committee consider that existing institutions must be used, with such developments as experience dictates, and with proper regard to existing rights and interests.

The Committee have had forced upon them the conclusion that a speeding up of every department of municipal and parliamentary government is necessary. Control of the streets is essentially a municipal function, and the same men should have before them the question of the adequacy of the streets, the facilities for traffic and its regulation, and the safety and convenience of pedestrians. Parliament could not be expected to deprive itself of power to secure equitable arrangements in the local legislation which it enacts, and in the supervision of local affairs by the various departments of State. It remains, therefore, so to adjust the municipal institutions of the metropolitan area and the instruments by which Government exercises control, that the public may feel confidence in the justice and impartiality of the decisions taken.

The Committee does not feel that a comparison between tramway and non-tramway streets, to which considerable importance was attached by Sir E. Henry, was of much assistance in indicating to them any method of securing greater safety; for fatal accidents are quite as numerous in streets where there are no tramways as in those where such lines exist. Mr. A. H. Stanley, who gave evidence on behalf of the London General Omnibus Company, did not lay any stress on the presence of tramways.

The table handed in by Colonel Hellard brings out a very striking comparison showing that electric railways have an immensely more favourable record for injuries, and for fatalities a record equal to tramways, and much superior to the omnibuses. The character of public vehicles on the streets closely affects the question of public safety. The design of tramcars is subject to two bodies—the Board of Trade and the Metropolitan Police. The Board of Trade have to inspect every tramway before it can be worked, and have made it a rule that promoters shall submit drawings of their cars before they have them built. The brakes of the London County Council are the most powerful known. While the brakes of some of the other tramway systems do not, perhaps, come quite up to the London County Council standard, they are considered satisfactory by the Board of Trade. Powers possessed by the police enable them to refuse a licence until they are satisfied that the brake is in proper working order, and they also inspect cars on the streets at any moment that seems fit to them. The Committee think, however, that the control of the brakes by one department should be sufficient, and that the experience of the Board of Trade fits it for this responsibility. The minimum of inspection while the vehicle is actually on the streets should be aimed at, and the management should be responsible for a system of daily inspection which will ensure that no vehicle will appear on the streets in an improper condition. The design of safety guard which has been adopted by the London County Council tramways has proved very effective, and has been approved by the Board of Trade.

## DEVELOPMENT OF THE MOTOR OMNIBUS.

The London General Omnibus Company afforded the fullest details to the Committee of its methods of working and control. While some points are open to criticism, on the whole the Committee recognise that the company is managed in a most capable manner. Motor omnibuses commenced to run in London in 1897, and their development has been exceedingly rapid. From the first type of omnibus employed down to the present "B" type there have been thirty-two designs, all of which have had to conform to the regulations of the Local Government Board as to heavy motors and the requirements of the Chief Commissioner of Police. The latter had a very difficult part to play in this development, as he had to protect the public and yet to permit that street experience which could alone make the vehicle permanently safe for public use. The accident record of the motor omnibus is set out below:—

| Year. | Licensed. | Fatalities. | Per 1,000 'Buses. |
|---|---|---|---|
| 1907 ... ... | 1,205 | 35 | 29.0 |
| 1908 ... ... | 1,133 | 62 | 54.7 |
| 1909 ... ... | 1,180 | 59 | 50.0 |
| 1910 ... ... | 1,200 | 70 | 58.3 |
| 1911 ... ... | 1,902 | 114 | 58.1 |
| 1912 ... ... | 2,908 | 182 | 62.6 |

Further improvements in design are foreshadowed, but not with great confidence. Mr. Worby Beaumont in his evidence before the Committee said that he hoped for solid tyres for omnibuses made so that they will offer the probability of very greatly reducing, if not eliminating, the side-slipping danger. Some criticism was made on the type of brake on the motor omnibus in evidence from representatives of drivers, but Mr. Beaumont stated that the brakes were fully competent to hold the driving wheels tight and prevent their rotation. The difficulty lies not so much in the brake as in the vehicle, and its responsiveness to the brake on a smooth road. According to the evidence submitted, there appears to be great difficulty in securing a satisfactory lifeguard to motor omnibuses. The London General Omnibus Company have a staff of a dozen men continually experimenting, but no progress appears to have been made.

The Committee say they have not exhausted the question whether a lighter omnibus would not avoid many of the present dangers. If reducing the weight would make the vehicle much more safe, the financial effect should not be given too much weight, and it is a problem which expert advisers might decide. Mr. Beaumont was of opinion that the omnibus is not too heavy and too powerful for the brakes, in view of the present conditions of London traffic. He considers a lighter vehicle desirable from other points of view.

He also stated that in addition to acting as technical adviser to the Chief Commissioner, he was technical adviser to the motor omnibus companies; and the Committee think that the technical adviser to the Chief Commissioner should be an independent official.

Both the tramcar and motor omnibus are dangerous vehicles from their weight and bulk and the power of their engines, and the systematic training of drivers is consequently a necessity. The Committee feel that the practice which prevails of paying motor omnibus drivers by the journey is inimical to safe working in crowded traffic.

## STOPPING PLACES.

The position of tram lines in the middle of the roadway raises a very acute traffic problem, which the Committee discuss at some length. This difficulty is aggravated by the presence of the motor omnibus, which exaggerates the danger while tramway passengers are crossing to and from the pavement. In connection with this cutting in upon tramway passengers, the question of stopping places for both tramcars and omnibuses appears to arise. A new solution, which seems to approve itself to the Committee, is that representatives of the local councils, tramway and omnibus authorities, and the Police Commissioner should meet and consult together. In this way it is hoped that a solution will be found for what has hitherto been a real difficulty. The Committee think that if there were present at this meeting an independent chairman from the Government department, a method of minimising friction and promoting safety would be secured.

The London County Council proposed a by-law to the following effect:—"No driver of an omnibus or other stage carriage shall stop such omnibus or stage carriage to take up or set down passengers in such a position in the immediate vicinity of any tramway stopping place as to cause obstruction to passengers or intending passengers alighting from or entering any tramcar."

The Committee think the principle suggested to be reasonable. As regards speed, the Committee do not recommend any alteration of the maximum for tramways nor for motor omnibuses, and they are of opinion that the procedure by which speed limits are fixed is satisfactory, and that the County Councils are the proper authority through which applications should be made, local opinion being duly heard. The Committee are of opinion that both tramcars and motor omnibuses should be fitted with speed registers as soon as practicable. Slow moving traffic is the cause of great delay, and the Committee recommend that a by-law should be immediately passed putting into operation the recommendations of the Royal Commission of 1905 that all vehicles proceeding at a slow or walking pace should be required to keep as close as practicable to the kerb. A serious cause of congestion within the inner ring is the existence of tramway "dead ends," and the Committee repeat the comment of the Royal Commission that it was difficult to appreciate how such a state of things could be tolerated so long, and whatever view might be held of the expediency of extending tramways in London, it cannot be expedient to work those we have upon inefficient methods.

Evidence was given which showed that there was considerable risk of accident and obstruction arising from the presence of many vehicles in an unsound condition, and the Committee considered it desirable that a by-law should be framed imposing penalties on any driver or owner who knowingly sent out an unsound vehicle.

## STREET WIDENINGS AND CONTRIBUTIONS OF TRAMWAYS AND OMNIBUSES.

The running of motor omnibuses has had considerable influence upon the question of street widenings. When widenings are made for tramways the tramways bear a large proportion of the cost, on the ground that they are introducing through traffic which did not before exist. Motor omnibuses are now running down similar streets, and they introduce through traffic which produces necessity for street widening, but provide no revenue to pay for it. Tramways also pay for paving the track and a portion at each side. These costs, with rates and taxes, are represented as being a charge of about £200 per car annually. A paragraph in the Report of the London Traffic Branch of the Board of Trade for 1911 states that omnibus companies pay no rates in respect of the roads which they use, but motor omnibuses pay "in the shape of the petrol tax about £45 per vehicle per annum. . . . Of the two, the tramways are less unfavourably situated in regard to these burdens." Colonel Hellard, head of the London Traffic Branch of the Board of Trade, who was not responsible for that volume, admitted the comparison was incorrect, and withdrew it.

When asked if he had to pay towards track and road improvements and rating on track equivalent to what the London County

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Council has, of £200 per vehicle, Mr. Stanley said he thought it would mean to the motor omnibus proprietors of London a sum somewhere about £600,000.

### ABOLITION OF THE LOCAL VETO.

As regards Parliamentary procedure, the Committee alluded to the obstruction offered to the building of tramways by the Metropolitan Borough Councils which have the right of veto, and they found that the extreme use of the veto goes beyond the purpose for which it was intended. The veto was originally granted to local authorities to prevent them being harassed with speculative schemes promoted by private interests. It was not at that time contemplated that there would be a central municipal authority which would become the sole tramways promoter in London. Standing Order 22 of both Houses of Parliament was meant to secure that local authorities should be consulted before private tramway schemes were submitted to Parliament, but the same check is no longer necessary to safeguard public interests. The Committee agree with the conclusions of the Royal Commission that any reasonable objection to the abolition of the veto would disappear after provision were made for the local authorities to state their views concerning any proposed tramway scheme to an independent and impartial body such as the new traffic branch which the Committee recommend.

### THE TRAFFIC BOARD AND ITS DUTIES.

It is agreed by all parties that the development of the motor omnibus has rendered very great service to London, but the omnibus has yet to be put under proper control. After careful consideration of the matter the Committee are of opinion that the routes, time-tables, and number of such carriages should be subject to regulations formulated by County Councils and County Borough Councils and confirmed by the new Traffic Branch with a right to local authorities and others interested to be heard. The Committee have carefully considered the question of machinery best to be used in controlling and providing for London traffic. These powers and duties are at present scattered, duplicated, and incomplete. The bodies to which they are entrusted are very numerous, and tenaciously uphold local interests. It becomes a question, not of setting up an ideal system which might meet with a maximum of opposition, but of utilising as far as possible existing bodies and laws, so as to enable them to meet the changed conditions with the least friction and delay. The Committee are of opinion that what is required is a new arrangement of the functions of Government departments. The duty of originating and accommodating traffic schemes and regulations is in their opinion a municipal duty. Co-ordination can be secured by consultation between adjoining municipal authorities, under the direction and advice of a Government department, which is itself properly constituted to meet the special conditions. In the outer London ring there are five counties, and each has within it many authorities. They cover an area of some 600 square miles. There are in addition the Metropolitan Borough Councils, which are important bodies with great financial resources behind them and representing important interests.

The Committee believe that the arrangements they suggest will be such as to secure their confidence. At present, as has been set out, no one Government department fulfils the requirements. The Committee contemplate a body of sufficient standing to command the respect and confidence of Parliamentary Committees and of all the municipal authorities with which it will come in contact. It should supersede or absorb the London Traffic Branch of the Board of Trade. It should consist of a small number of specially qualified persons, and the choice should not be limited to Government officials. Expert advice of the highest character should be put at its disposal. The Committee do not propose that the body should be a separate Government department, but recommend that it should be a branch of the Board of Trade.

The duties of the New Traffic Branch as briefly outlined by the Committee are as follow :—

All schemes relating to London Traffic presented to Parliament should be examined and reported upon by it, and no other Department should report to Parliament, except through it.

It should actively concern itself with the traffic problems of London, working through and in harmony with the various existing bodies responsible for the various areas.

It should hold conferences, if requested or by its own motion, with the representatives of various municipal authorities concerning the development of through traffic routes, and other matters in which common action or agreement is advisable.

It should have power to hold public inquiries in order that the interests of localities may be ascertained, and due weight given to them in consideration of all projected undertakings or new by-laws. It should have power to summon witnesses.

All by-laws relating to London traffic should come before it for confirmation. It should be the confirming authority for the regulations of County Councils and County Borough Councils as to routes, etc., of stage carriages; and should hear appeals from the decisions of Councils.

It should fix where it considers necessary, on the application of a local authority, special speed limits for motor omnibuses and speed limits for all motor traffic.

It should have power to regulate the structural character of all stage carriages.

It should receive reports, from the police and parties concerned, of all traffic accidents, and special reports from coroners of inquests.

Other duties might be laid or devolved upon it as experience suggests.

## NEW AND PROSPECTIVE WORK.

READING TOWN COUNCIL, after a long discussion at the meeting held last week, decided to promote a railless trolley Bill in the next session of Parliament.

CANADIAN ELECTRIC RAILWAY.—It is reported from Canada that the Canadian Pacific Railway is about to commence the construction of an electrical line from Hamilton to Niagara Falls. By its construction the Canadian Pacific Railway will be in a position to handle traffic direct from Hamilton to Buffalo on their own lines, and it will be no longer necessary to run traffic over the routes of other companies.

DIESEL GENERATING SET FOR FELIXSTOWE.—Mr. H. R. Hooper, on behalf of the Local Government Board, has held an inquiry into the application of the Felixstowe Urban District Council for sanction to borrow £4,729 for the extension of the electric supply plant, by the provision of a 150 kw. Diesel generating set. The inspector elicited the fact that the Diesel set was required to supersede some old gas engines, and after discussion it was decided to amend the application, the sum asked in revision being £2,800.

DONCASTER TOWN COUNCIL have agreed to purchase six additional tramcars at an estimated cost of £5,000 and to enlarge the car shed at the cost of £750. The question of buying six or eight motor omnibuses to run between Doncaster and outlying districts is being considered.

NEW CAR SHED FOR ROTHERHAM.—Rotherham Electric Light and Tramways Committee have recommended the acceptance of the tender of Messrs. Chadwick and Company for the extension of the car sheds in Rawmarsh Road at £11,643. After some discussion the Council approved the recommendation of the Committee. Alderman Winter, chairman, said that the subject had been talked about for months, and it was essential that the cars should be housed as early as possible.

NEW CARS FOR DUNDEE.—Dundee Tramways Committee have authorised the tramways manager to obtain tenders for four additional cars.

ROTHERHAM BOROUGH COUNCIL propose to apply to the Board of Trade for a provisional order authorising the construction of electric tramways along the new street in Millgate and adjoining streets, so as to connect the route with the present tramways.

SOUTH SHIELDS.—The Town Council have adopted a recommendation to borrow £30,000 for the purpose of installing a new generator set and other plant at the electricity works.

## MISCELLANEOUS NEWS AND NOTES.

**Heston and Isleworth Urban District Council** have agreed to suspend their power to acquire the undertaking of the London United tramways within their district until 1930.

**Tubes Suggested for Glasgow.**—The Corporation is considering the appointment of a special committee, which will be charged with the duty of reporting on a scheme of electric tube railways between the east and west of the city.

**Indian Rules for Motor Cars.**—The Government of India is reported to be considering the question of consolidating the provincial rules relating to motor cars with the object of securing uniformity and convenience for the travelling public. Possibly legislation may be undertaken in connection with this matter in the near future.

**Record Traffic at Burnley.**—Councillor Heap, chairman of the Tramways Committee, at a recent meeting of the Burnley Town Council, said that for the five days covering the period of the Royal Lancashire Show the tramways carried 437,795 passengers, and the receipts amounted to £2,414. This established a record for the Burnley tramways.

**Municipal Tramways Conference.**—At a meeting of the Sheffield City Council this week, Sir William Clegg said that in connection with the forthcoming visit of the Municipal Tramways Conference in September arrangements for extending "Sheffield and Yorkshire hospitality" were well in hand. The Lord Mayor proposed to extend hospitality in a very marked degree.

**Employees' Agitation in Dublin.**—The Dublin tramway employees are making an application for a further all round increase of 2s. 6d. per week. It appears that the men were not willing to accept as satisfactory the increase of 1s. a week recently granted by the directors. Agitators are encouraging the men to strike, and there is some fear that they may be misguided enough to do so.

**Standing Compartments in Bombay Cars.**—Bombay Council have adopted a recommendation by the Tramways Committee that the company be allowed to introduce two standing compartments in their bogie cars for a period of three years from January, 1914, to provide accommodation for passengers during the crowded hours of traffic. The passengers are to be allowed to stand, the convenience having been demanded by the public.

**Position of Glasgow Tramways.**—Assuming that there are no further extensions, the Glasgow tramways will be free from debt within four years. After this time the annual surplus should be a very large one, amounting from £200,000 to £400,000, and a writer in the "Glasgow Evening News" asks how this large sum will be disposed of. Hitherto very liberal allowances have been made to the depreciation and reserve accounts, so that no less a sum than £2,040,000 stands at the credit of the depreciation and permanent-way renewal funds. Of that amount £1,852,500 is invested with the Common Good.

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**Glasgow Corporation and Omnibuses.**—Glasgow Tramways Committee propose to make application for further powers to run omnibuses in the city and in the adjoining districts. Authority will also be asked to deal with the frequent and serious interruptions to the car service through obstructions on the track, caused by the breaking-down of, out of repair, or overloaded vehicles, and, in the event of proved negligence, to charge for the cost of the removal and loss caused by the interruption.

**The Newburn Tramways.**—A further portion of the Newcastle Corporation tramways between Scotswood and Newburn will shortly be available for public service. Colonel Von Donop, the Board of Trade inspector, examined the route to Sandy Banks a fortnight ago, but advised that cars should not be run from Lemington to that point until they were supplied with mechanical slipper brakes. This has been done, and the cars will travel from Scotswood to Sandy Banks, which is close to Newburn Steel Works.

**Tramway and Omnibus Passengers in London.**—Mr. Buxton (President of the Board of Trade), replying to Mr. W. Rea in the House of Commons on Wednesday, said that the number of passengers carried by tramway authorities working in Greater London during the year ended December 31, 1912, in the case of companies, and March 31, 1913, in the case of local authorities, amounted to 798,672,549, and the number carried during 1912 by omnibuses was upwards of 500,000,000. The corresponding figures for the first half of 1913 could not be given.

**Siding Accommodation to Avoid Delay.**—Leeds Tramways Committee recommend that siding accommodation be provided in Roundhay Road at the junction with Harehills Road. Harehills is the terminus for a number of routes. Beeston cars, Haddon Place cars, Victoria Road cars, and Whitehall Road cars all turn back at Harehills, and proceed a few yards past the terminus on the up line, wait their turn there, and then run over the cross line on to the down line. Until the operation is completed they block the line to Roundhay, the Roundhay cars often having to wait some minutes before they can move.

**The New Pattern Cars at Liverpool.**—Representatives of the Glasgow tramways recently visited Liverpool and inspected the car designed by Mr. Mallins, having a separate entrance and exit on the platform. A Glasgow journal says:—"It is understood that the Liverpool management is delighted with the experiment, and that at least a score of the new cars have been ordered. Nevertheless, it is a moot point whether the latest type would suit the unrivalled rushes which are made at the car stations in central Glasgow at least." The Liverpool cars were described and illustrated in our issue of November 12, 1912.

**Bristol Corporation and the Tramways.**—As mentioned in our issue of August 2, Mr. J. B. Hamilton, general manager of the Leeds Corporation Tramways, and Mr. J. F. C. Snell, consulting engineer, have been engaged in the preparation of their report in connection with the possible purchase of the tramways by the Corporation on May 1, 1915. Under section 43 of the Tramways Act, 1870, the Corporation will at that date have the option of taking over the lines. The special committee of the Council appointed to consider the matter have held several meetings, and it is understood that they will be in a position to report to the Council in September.

**Tramways v. Motor Omnibuses at Oxford.**—The latest plan for providing Oxford with a modern electric tramway service is arousing a good deal of opposition, and an agitation in favour of motor omnibuses instead of tramcars is proceeding energetically. The position is, however, that the National Electric Construction Company have an agreement with the City Council, under which the former are to run electric tramcars, and without their consent it will be impossible to substitute motor omnibuses. The probability is that the electric system will in due course be introduced. The date at which the National Electric Construction Company will undertake to complete the electrification of the tramways has not yet been fixed.

**Middlesex Tramways.**—Representatives of the Middlesex County Council Light Railways and Tramways Committee visited Acton recently, and with representative members and officials of the Acton Council discussed the possibility of effecting a physical connection between the M.C.C. Tramways, terminating at Horn Lane, and the London United Electric Tramways passing along the High Street within a hundred yards of Horn Lane. The proposal has emanated from the Middlesex County Council, and is to the effect that the connecting line shall be laid through King Street, joining the London United Tramways by turning in a westerly direction. The outcome of such a junction would be that passengers between Ealing, West Acton, and Willesden would probably be able to reach their destination without changing cars. This would, of course, be of considerable benefit to the travelling public, besides which, anyone can foresee other possibilities if a physical connection should be agreed upon.

**Nottingham and Derbyshire Tramways.**—The Nottinghamshire and Derbyshire Tramways Company, the whole of whose issued shares and debenture scrip were acquired by the Tramways, Light and Power Company, Limited, of 22a, College Hill, Cannon Street, E.C., in 1912, has various powers for the construction of tramways in the counties of Nottingham and Derby and the city of Nottingham, and running powers over certain of the Nottingham Corporation tramways. The directors of the company are the Rt. Hon. Viscount Chilston, Mr. A. A. Holland, and Mr. George Balfour; the secretary is Mr. W. Bryden. The line, which is now in course of construction, has an aggregate length of about 13½ miles, and will connect Ripley with the city of Nottingham. Contracts for construction are being carried out by Messrs. Balfour, Beatty and Co., Limited. As mentioned in our last issue, the new system was opened between Heanor and Cinder Hill on August 7 after inspection by Lieut.-Colonel Druitt, of the Board of Trade. The new cars, which are painted in a pale yellow, gold, and green are much admired. Good progress is being made with the construction of the connecting line from Cinder Hill to Basford. A good deal of road widening is necessary as well as some displacement of gas and water mains, while two canal bridges have had to be strengthened. The new line will bring such populous districts as Codnor, Heanor, Langley Mill, Eastwood, and Kimberley into touch with Nottingham.

**Railless Traction in Lancashire.**—After a series of satisfactory trial runs the Board of Trade inspection took place on Monday last of a new railless system laid down by the Urban District Council of Ramsbottom, near Bury, Lancashire. The omnibuses will run between a spot close to Holcombe Brook Station, on the Lancashire and Yorkshire Railway, and the hamlet of Edenfield, on the road to Rawtenstall, passing through Ramsbottom and calling at Ramsbottom Station, a distance of about five miles. This will open quite a new but hilly district containing some of the finest scenery in the country. The results of the venture are being closely watched by the adjoining local authorities; if satisfactory the system will be extensively adopted by them to serve their respective tramways. As it is, the Edenfield terminus being a short two miles from the Rawtenstall, a short walk or run on the high pressure electric trains over the three miles Bury to Holcombe (lately opened by the L. and Y. Railway), will enable the residents of Manchester and district to reach North-East Lancashire by a shorter route than the one through Rochdale and Bacup; moreover, Ramsbottom will now possess the means of transit due to its size and importance. The omnibuses are similar to those at Stockport and Leeds, with certain improvements in the fittings. The current is being supplied by the Lancashire Electric Power Company, and the Railless Electric Traction Company are the contractors for the equipment. The usual double trolley and four overhead wires are provided with loops at the termini to save reversing.

## CONTRACTS AND ORDERS.

**Vickers, Limited,** have an order for 125 tramcar wheel tyres from Sheffield Corporation.

**Messrs. C. Richards and Sons** have an order from Salford Corporation for single-ended tie-bars for tramways.

**W. S. Laycock, Limited,** have supplied rollers and blinds to Walsall Corporation for cars now being fitted with vestibules.

**Watlington and Company, Limited,** have an order from Stockport Corporation Tramways Committee for pressed steel gear cases.

**Bolton Electricity Committee** has accepted the tender of Stewarts and Lloyds for steam and hot water pipes for their new station.

**Chamberlain and Hookham, Limited,** have received a contract from Rotherham for meters of 10 amperes capacity and upwards.

**Sheffield Corporation** have placed an order with Messrs. Longbottom and Company for coal for the generating station at 9s. 11d. per ton.

**Siemens Brothers and Company, Limited,** will supply a high-tension switchboard to Bexley Urban District Council, at a price of £867.

**The Electric Construction Company** have received a contract from Blackburn Corporation for the supply of electric motors for the electricity department.

**The Atlas Resilient Road Wheel Company, Limited,** have received an order from Stockport Corporation for a set of spare wheels for trackless trolley vehicles.

**Edgar Allen and Company, Limited,** are to supply six 15ft. lengths of manganese rail, with fish-plates, bolts, etc., for a section of the Temple Mills curve of the Leyton tramways.

**Manchester Corporation Tramways Committee** have accepted tenders for tramcar trucks from the Brush Electrical Engineering Company, and for tramcar wheel centres from Edgar Allen and Company.

**The Brush Electrical Engineering Company's** tender for 25 double-deck top-covered extended canopy cars has been accepted by Sheffield Corporation at £640 per car, plus 5 per cent. for contingencies.

**The Lea Recorder Company, Limited,** will supply and erect a combined indicator and recording water meter, including tank and float chamber, for Sheffield Corporation. The contract amounts to £880.

## PERSONAL.

**Mr. R. Leigh Griffin** arrived at Southampton on August 9 from Santos on three months' leave.

**Mr. F. P. Seager** has been appointed shift engineer at Manchester at a commencing salary of £175.

**Bailie W. B. Smith,** convener of the Electricity Committee, and Mr. W. W. Lackie, chief electrical engineer, will shortly leave Glasgow for the United States and Canada, where they propose to inspect the largest electrical installations, as mentioned in a recent issue.

**Mr. J. S. D. Moffet,** who is vacating the position of manager of the Rochdale Corporation Tramways, to take charge of the West Ham undertaking, has been presented by the employees of the Rochdale tramway department with a handsome silver double entree dish and a silver hot water jug. Inspector Venting made the presentation on behalf of the employees, and when handing

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the gifts to Mr. and Mrs. Moffet said that they were a token of the respect which the employees felt for Mr. Moffet, who had been manager since 1904. In replying, Mr. Moffet said that the system had grown into a large and important undertaking, and he was proud of all branches of the service. He was glad to think that, in spite of any dispute which had arisen during his management, there had always been a good feeling between himself and his employees. Several other speakers referred appreciatively to Mr. and Mrs. Moffet's interest in the various branches of the undertaking.

## FINANCIAL REPORTS AND MEETINGS.

**Hadfield's Steel Foundry Company.**—The directors recommend an interim dividend of 5 per cent., free of income-tax, on the ordinary shares for the past half-year.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended August 8 amounted to £67,350. Upon such of the lines as were working both last year and this year the receipts show an increase of £0,335 upon the week.

**Edison Accumulators, Limited.**—This company was registered on August 5 with a capital of £150,000 in 135,000 7 per cent. participating preference shares of £1 each, and 300,000 ordinary shares of 1s. each. The first directors, to number not less than three and not more than eight, are Lord Montague of Beaulieu, 62, Pall Mall, S.W., Colonel H. C. L. Holden, Gifford House, Blackheath, A. L. Pearce, Worcester House, Walbrook, E.C., and J. F. Monnott, 49, Old Broad Street, E.C.

**Manaos Tramways and Light.**—At the meeting held on Thursday last the chairman, Mr. I. M. Booth, reported that the company had been unable to recover from the State of Amazonas the debt of £23,676 due to them. A dividend of £4 per cent. was passed after making due provision for reserve funds, and £3,450 was carried over. The tramway receipts have decreased while the income from lighting has increased; the gross income having increased from £147,280 to £15,741, while the working expenses have fallen from 76½ per cent. to 57.2 per cent.; the result being that the net surplus shows an increase of 72 per cent.

**Tyneside Tramways and Tramroads Company.**—The half-yearly meeting was held in Newcastle on August 11, when Dr. J. T. Merz, chairman, who presided, said that there had been an appreciable increase in the revenue and the dividend. The traffic receipts showed an increase of £1,049, as compared with the corresponding period of last year, and the surplus of receipts over expenses amounted to £5,446. With the balance brought forward from the last half-year of £427, there was a total of £5,873, and after deducting interest on debentures, etc., amounting to £1,009, the available balance was £4,804. This balance has been appropriated as follows:—Dividend on preference shares at the rate of 5 per cent. per annum, £601; dividend on the ordinary shares at the rate of 3 per cent. per annum, £2,008; to reserve for renewals, depreciation, etc., £1,200; reduction of registration and formation expenses, £330; leaving £724 to be carried forward. The chairman intimated that the directors had decided to invest the large balance in hand in trust securities to yield 4 per cent. per annum. It appeared from the report that the amount at the credit of reserve for renewals, depreciation, and other contingencies, was £14,538.

**Walter Scott, Limited.**—The trading profits of Walter Scott, Limited, for the year ended June 30 were £91,303, and £655 was brought forward. Debenture interest absorbs £12,000, and directors' fees £1,500. A final dividend of 7½ per cent. is proposed on the ordinary shares, making 10 per cent. for the twelve months, adding £24,676 to the reserve funds, writing £6,750 off investments, and carrying forward £1,623. The board report that the output at the steel works and collieries considerably improved upon the previous year, but the brick and cement works remained in a languid condition owing to the stagnation in the building trade. Electric generating plant, consisting of two mixed flow turbine generators with necessary machinery complete for pumping and haulage, has been installed at East Hetton Colliery; and at Trimdon Grange a battery of 55 patent coke ovens, with coal washery and by-product plant, has been erected. The trading profits for 1911-12 were £55,552, for 1910-11 £45,536, for 1909-10 £49,537, and 1908-9 £9,830. Twelve months ago two years' dividends were paid on the preference shares and £10,428 reserved. In 1911 and 1910 a year's dividend was paid on those shares, sums of £10,121 and £17,537 set aside, and £5,027 and £1,112 carried forward, but in 1909 no distribution was made. £682 remaining after providing for debenture interest.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended August 9 amounted to £287,743, or £26,879 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £106 2s. per track mile, an increase of £8 0s. 8d. per mile as compared with last year.

**Messrs. Thermit, Limited,** have removed into larger and more convenient works at 675, Commercial Road, London, E., to which all goods should in future be sent. All communications should be addressed to 27, Martin's Lane, Cannon Street, E.C., as before. Their telephone number has also been altered, and is now 4202 City (2 lines).

## COPPER AND ALUMINIUM MARKET.

August 15, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, August 15. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 69 15 0 | 68 15 0 | 78 3 7 |
| ,, (three months) .. .. | 69 15 0 | 68 15 0 | 78 1 3 |
| Electrolytic Copper—bars or ingots .. | 72 15 0 | 71 10 0 | 81 5 0 |
| Aluminium—bars or ingots .. .. .. | 86 10 0 | 86 10 0 | 77 0 0 |

## COAL MARKET.

August 15, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, August 15. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 | 25 6 | 22 6 | 23 6 |
| Best Seconds .. .. .. | 24 9 | 24 0 | 21 9 | 22 6 |
| Ordinary Drys .. .. | 21 0 | 21 0 | 20 0 | 19 6 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | 19 0 | 19 0 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 17 6 | 17 6 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 | 21 0 | 17 6 | 19 6 |
| Best Seconds .. .. | 20 3 | 19 6 | 16 9 | 18 6 |
| Ordinary Drys .. .. | 16 6 | 16 6 | 15 0 | 15 6 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 14 0 | 15 0 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 12 6 | 13 6 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 6 | 15 3 | 14 7½ | 11 3 |
| Best Seconds .. .. | 13 6 | 13 6 | 12 9 | 10 0 |
| Smalls .. .. .. | 10 0 | 10 0 | 9 0 | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Aug. 12 | £48,410 | £54,126 | 33 | £1,780,187 | +£156 553 |
| Auckland..... (28 days) | June 6 | 18,179 | 20,007 | 49 | 240,980 | + 31,993 |
| Ballarat and Bendigo | June 29 | 805 | 850 | 13 | 11,994 | — 125 |
| Bombay ..... Rs. | July 18 | 2,886 | 3,209 | 29 | 90,234 | + 3,631 |
| Brazilian St. Rly. Mlrs | June | 40,854 | 48,882 | 47 | 496,129 | + 17,623 |
| Brazilian Traction..... | July 19 | 81,656 | 95,378 | 29 | 2,635,430 | + 378,635 |
| Brisbane ..... | July | 23,060 | 26,205 | 30 | 177,208 | + 46,494 |
| British Columbia ..... $ | June | 498,206 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | June | 5,985 | 6,249 | 26 | 39,560 | + 1,861 |
| Buenos Aires Lacroze.. | July | 42,052 | 45,324 | 4 | 45,324 | + 3,272 |
| Calcutta.....Rs. | Aug. 9 | 62,042 | 65,534 | 32 | 20,29,836 | + 95,175 |
| Cape Town ..... | June | 11,076 | 11,560 | 26 | 75,483 | + 4,640 |
| Carthagena & Herreria | July | 3,350 | 3,794 | 30 | 21,125 | + 6,042 |
| East India ..... | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie..... | June | 3,351 | 2,854 | 26 | 17,226 | — 1,431 |
| La Plata..... | July | 3,592 | 4,770 | 30 | 36,342 | + 7,999 |
| Lima..... | July | 32,259 | 34,410 | 30 | 232,637 | + 10,261 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | July 31 | 25,153 | 27,430 | 30 | 875,087 | + 28,058 |
| Melbourne ..... | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico ..... $ | June | 558,355 | 588,780 | 26 | 3,265,540 | — 5,881 |
| Montevideo..... | July | 25,435 | 28,189 | 39 | 287,602 | + 23,745 |
| Para ..... | Aug. 10 | 4,069 | 3,940 | 36 | 146,152 | + 2,661 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | June | 2,974 | 3,268 | 26 | 21,871 | + 6,632 |
| Shanghai .....$ | Aug. 6 | 20,853 | 26,200 | 31 | 662,632 | + 65,622 |
| Singapore .....$ | Aug. 9 | 10,676 | 12,232 | 32 | 375,559 | + 42,763 |
| Toronto .....$ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....$ | June | 300,402 | 821,037 | 26 | 1,972,374 | + 163,671 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London..... | Aug. 9 | £4,419 | £3,647 | 32 | £159,141 | +£12,621 |
| City and South London | ,, 9 | 2,847 | 2,601 | 32 | 90,520 | — 8,356 |
| Liverpool Overhead..... | ,, 10 | 1,841 | 2,101 | 32 | 54,601 | + 4,327 |
| London Electric..... | ,, 9 | 11,765 | 11,840 | 32 | 445,580 | + 5,585 |
| Mersey ..... | ,, 9 | 2,158 | 2,289 | 32 | 71,510 | + 4,751 |
| Metropolitan ..... | ,, 10 | 16,509 | 16,867 | 32 | 537,722 | + 3,337 |
| Metropolitan District... | ,, 9 | 11,733 | 12,737 | 32 | 419,924 | + 17,511 |


# DICK, KERR & CO.,

**Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**


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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Aug. 6 | £1,646 | £2,031 | + £385 | 10 | £16,820 | + £1,027 |
| Ayr Corporation ..... | ,, 9 | 473 | 706 | + 234 | 12 | 6,209 | + 515 |
| Bath Electric ..... | ,, 6 | 1,287 | 1,615 | + 328 | 32 | 29,999 | + 1,685 |
| Birmingham Corp. ..... | ,, 9 | 10,403 | 11,384 | + 982 | 19 | 216,655 | + 15,431 |
| Blackburn Corporation | ,, 6 | 1,212 | 1,390 | + 178 | 19 | 25,457 | + 2,175 |
| Blackpool & Fleetwood | ,, 9 | 2,545 | 3,131 | + 586 | 6 | 10,589 | + 1,260 |
| Blackpool Corporation | ,, 7 | 4,696 | 5,786 | + 1,090 | 18 | 37,189 | + 4,359 |
| Bolton Corporation ..... | ,, 10 | 2,722 | 2,781 | + 59 | 19 | 52,155 | + 2,482 |
| Bournemouth Corp..... | ,, 13 | 2,638 | 3,174 | + 536 | 19 | 42,189 | + 4,432 |
| Bradford Corporation... | ,, 9 | 5,710 | 6,365 | + 655 | 19 | 114,008 | + 6,219 |
| Brighton Corporation.. | ,, 10 | 2,151 | 2,570 | + 419 | 19 | 22,057 | + 643 |
| Bristol ..... | ,, 8 | 8,711 | 11,619 | + 2,908 | 31 | 250,935 | + 34,292 |
| British Elec. Traction— | | | | | | | |
| Airdrie ..... | Aug. 8 | 281 | 358 | + 77 | 32 | 10,758 | + 1,574 |
| Barnsley ..... | ,, 8 | 293 | 391 | + 198 | 32 | 8,632 | + 3,225 |
| Barrow ..... | ,, 8 | 516 | 676 | + 160 | 32 | 12,901 | + 868 |
| Birmg. & Mid. Joint— | | | | | | | |
| Birmingham Dist. ... | Aug. 8 | 1,199 | 1,296 | + 97 | 32 | 32,235 | + 1,482 |
| Dudley—Stourbridge | ,, 8 | 1,576 | 1,845 | + 269 | 32 | 30,477 | + 2,708 |
| South Staffordshire... | ,, 8 | 1,269 | 1,318 | + 49 | 32 | 31,809 | + 2,264 |
| Wolverhampton Dist. | ,, 8 | 693 | 779 | + 86 | 32 | 16,498 | + 1,222 |
| Devonport ..... | ,, 8 | 670 | 791 | + 121 | 32 | 17,376 | + 288 |
| Gateshead ..... | ,, 8 | 1,117 | 1,808 | + 691 | 32 | 39,724 | + 7,239 |
| Gravesend & N'thfleet | ,, 8 | 288 | 386 | + 98 | 32 | 7,400 | + 890 |
| Greenock—P.Gl'sgow | ,, 8 | 925 | 1,189 | + 264 | 32 | 27,563 | + 2,337 |
| Jarrow ..... | ,, 8 | 174 | 233 | + 59 | 32 | 4,650 | + 334 |
| Kidderminster ..... | ,, 8 | 348 | 411 | + 63 | 32 | 4,008 | + 168 |
| Merthyr ..... | ,, 8 | 289 | 363 | + 74 | 32 | 7,036 | + 838 |
| Metropolitan ..... | ,, 8 | 10,958 | 11,028 | + 970 | 32 | 287,227 | + 6,786 |
| Middleton ..... | ,, 8 | 395 | 450 | + 55 | 32 | 11,281 | + 692 |
| Oldham—Ashton..... | ,, 8 | 666 | 710 | + 44 | 32 | 19,713 | + 431 |
| Peterborough ..... | ,, 8 | 198 | 326 | + 128 | 32 | 5,518 | + 1,219 |
| Potteries ..... | ,, 8 | 2,288 | 2,346 | + 58 | 32 | 66,612 | + 7,347 |
| Rothesay ..... | ,, 8 | 597 | 746 | + 149 | 32 | 7,646 | + 681 |
| Sheerness ..... | ,, 8 | 83 | 97 | + 14 | 32 | 1,687 | + 116 |
| South Metropolitan... | ,, 8 | 1,073 | 1,205 | + 132 | 32 | 26,501 | — 397 |
| Southport ..... | ,, 8 | 486 | 551 | + 65 | 32 | 10,110 | + 655 |
| Swansea ..... | ,, 8 | 1,844 | 2,021 | + 177 | 32 | 40,066 | + 3,908 |
| Taunton ..... | ,, 8 | 70 | 70 | Nil | 32 | 1,518 | + 99 |
| Tynemouth..... | ,, 8 | 630 | 808 | + 178 | 32 | 8,522 | + 846 |
| Weston-super-Mare ... | ,, 8 | 683 | 953 | + 270 | 32 | 5,239 | + 936 |
| Worcester ..... | ,, 8 | 525 | 655 | + 130 | 32 | 10,032 | + 739 |
| Wrexham & District.. | ,, 8 | 144 | 174 | + 30 | 32 | 3,881 | + 387 |
| Yorks (Woollen) Dist. | ,, 8 | 1,109 | 1,269 | + 160 | 32 | 36,722 | + 2,780 |
| Burnley Corporation ... | ,, 9 | 1,576 | 2,107 | + 531 | 19 | 32,757 | + 4,472 |
| Burton-on-Trent Corp. | ,, 10 | 334 | 381 | + 47 | 19 | 5,526 | + 140 |
| Bury Corporation..... | ,, 10 | 1,339 | 1,375 | + 36 | 20 | 26,182 | + 771 |
| Cardiff Corporation..... | July 26 | 2,585 | 2,950 | + 365 | 17 | 45,804 | + 4,663 |
| Chatham and District.. | Aug. 7 | 1,194 | 1,283 | + 89 | 31 | 28,323 | + 1,297 |
| Chesterfield Corp. ..... | ,, 7 | 258 | 316 | + 58 | 18 | 4,857 | + 603 |
| Colne & Trawden..... | ,, 9 | 278 | 333 | + 55 | 32 | 8,696 | + 551 |
| Cork Electric..... | ,, 7 | 523 | 573 | + 50 | 31 | 15,479 | + 61 |
| Croydon Corporation ... | ,, 1 | 1,774 | 1,657 | — 117 | 17 | 29,570 | — 4,300 |
| Darlington Corporation | ,, 9 | 238 | 266 | + 28 | 19 | 4,749 | + 445 |
| Derby Corporation ..... | ,, 9 | 1,045 | 1,147 | + 102 | 19 | 18,805 | + 2,052 |
| Dover Corporation ..... | ,, 9 | 370 | 376 | + 6 | 19 | 4,734 | — 183 |
| Dublin & Lucan ..... | ,, 8 | 199 | 242 | + 43 | 5 | 1,087 | + 44 |
| Dublin United ..... | ,, 8 | 6,364 | 7,540 | + 1,176 | 31 | 189,388 | + 5,368 |
| Dundee City ..... | ,, 8 | 1,137 | 1,301 | + 164 | 12 | 16,003 | + 1,407 |
| East Ham Corporation | ,, 9 | 1,127 | 1,061 | — 66 | 19 | 19,600 | — 594 |
| Exeter Corporation ... | ,, 8 | 444 | 489 | + 45 | 19 | 6,653 | + 190 |
| Gearless Mo'or 'Buses. | ,, 9 | ... | 632 | ... | 19 | 7,888 | ... |
| Glasgow Corporation ... | ,, 9 | 17,579 | 19,302 | + 1,723 | 10 | 196,614 | + 14,371 |
| Glossop (U. Elec. Supply) | ,, 9 | 137 | 140 | + 3 | 32 | 4,109 | + 481 |
| Halifax Corporation ... | ,, 5 | 2,092 | 2,521 | + 429 | 18 | 39,544 | + 114 |
| Hastings & District..... | ,, 7 | 1,645 | 2,050 | + 405 | 32 | 30,899 | + 1,793 |
| Huddersfield Corp. ..... | ,, 9 | 2,074 | 2,408 | + 334 | 19 | 40,883 | + 2,586 |
| Hull Corporation ..... | ,, 9 | 3,033 | 3,216 | + 153 | 19 | 57,905 | + 3,051 |
| Ilford U.D.C. ..... | ,, 9 | 643 | 548 | — 95 | 19 | 8,799 | — 1,563 |
| Ilkeston Corporation ... | ,, 13 | 117 | 132 | + 15 | 20 | 2,617 | + 514 |
| Ipswich Corporation ... | ,, 9 | 636 | 684 | + 48 | 16 | 8,953 | + 47 |
| Isle of Thanet ..... | ,, 9 | 2,032 | 2,337 | + 305 | 45 | 25,231 | + 886 |
| Kilmarnock Corp. ..... | ,, 9 | 170 | 172 | + 2 | 12 | 2,308 | + 161 |
| Lanarkshire ..... | ,, 7 | 1,431 | 1,650 | + 219 | 31 | 51,670 | + 6,739 |
| Lancashire United ..... | ,, 6 | 1,590 | 1,931 | + 341 | 31 | 46,871 | + 4,836 |
| Leeds City ..... | ,, 9 | 7,978 | 9,161 | + 1,183 | 19 | 158,675 | + 10,323 |
| Leicester Corporation... | ,, 9 | 2,838 | 3,043 | + 205 | 32 | 88,838 | + 8,092 |
| Leith Corporation ..... | ,, 9 | 672 | 752 | + 80 | 12 | 9,276 | + 237 |
| Liverpool Corporation.. | ,, 9 | 13,089 | 14,348 | + 1,259 | 31 | 406,985 | + 29,277 |
| Llandudno & Colwyn B. | ,, 8 | 1,086 | 1,097 | + 11 | 36 | 10,904 | + 987 |
| London County Council | ,, 6 | 42,115 | 43,285 | + 1,170 | 18 | 775,024 | — 22,101 |
| London Gnl. Omnibus.. | ,, 9 | 54,090 | 70,246 | + 16,156 | 32 | 1,987,883 | + 427,103 |
| London United ..... | ,, 8 | 8,219 | 9,382 | + 1,163 | 32 | 199,360 | — 892 |
| Lowestoft Corporation | ,, 9 | 577 | 542 | — 35 | 44 | 8,433 | + 219 |
| Maidstone Corporation | ,, 7 | 270 | 286 | + 16 | 19 | 3,935 | + 197 |
| Manchester Corp..... | ,, 9 | 17,081 | 17,969 | + 888 | 19 | 335,365 | + 16,279 |
| Nelson Corporation..... | ,, 9 | 196 | 234 | + 38 | 19 | 4,066 | + 231 |
| N'castle-on-Tyne Corp. | ,, 9 | 4,300 | 4,994 | + 685 | 19 | 91,405 | + 7,632 |
| Newport (Mon.) Corp.... | ,, 2 | 738 | 831 | + 93 | 18 | 13,444 | + 816 |
| New St. Helens & Dist... | ,, 6 | 1,128 | 1,391 | + 263 | 6 | 5,477 | + 778 |
| Northampton Corp ..... | ,, 8 | 660 | 746 | + 86 | 18 | 11,019 | + 314 |
| Nottingham Corp. ..... | ,, 7 | 3,501 | 3,663 | + 162 | 18 | 62,119 | + 1,909 |
| Oldham Corporation ... | ,, 10 | 2,121 | 2,234 | + 113 | 20 | 44,039 | + 2,442 |
| Portsmouth Corp..... | ,, 9 | 3,100 | 3,724 | + 624 | 19 | 44,333 | + 482 |
| Preston Corporation ... | ,, 6 | 1,267 | 857 | — 410 | 19 | 16,930 | + 844 |
| Provincial ..... ..... | ,, 9 | 3,191 | 3,877 | + 686 | 45 | 82,554 | + 4,696 |
| Reading Corporation ... | ,, 7 | 795 | 905 | + 110 | 18 | 12,927 | + 686 |
| Rochdale Corporation | ,, 9 | 1,594 | 1,717 | + 123 | 19 | 30,779 | + 813 |
| Rotherham Corp. ..... | ,, 13 | 775 | 1,011 | + 236 | 19 | 18,984 | + 4,962 |
| Salford Corporation ... | ,, 11 | 4,904 | 4,950 | + 46 | 19 | 100,648 | + 3 121 |
| Sheffield Corporation... | ,, 10 | 6,847 | 7,171 | + 324 | 20 | 144,890 | + 13,773 |
| Southampton Corp. .... | ,, 6 | 1,593 | 1,838 | + 245 | 18 | 24,604 | + 765 |
| Southend-on-Sea Corp. | ,, 6 | 1,570 | 1,983 | + 413 | 19 | 17,923 | + 2,038 |
| South Shields Corp..... | ,, 9 | 758 | 945 | + 187 | 19 | 13,872 | + 1,831 |
| Sunderland Corp. ..... | ,, 10 | 1,822 | 2,047 | + 225 | 19 | 28,123 | + 3,088 |
| Sunderland District ... | ,, 6 | 562 | 779 | + 217 | 40 | 21,738 | + 4,064 |
| Swindon Corporation ... | ,, 6 | 212 | 226 | + 14 | 18 | 3,021 | + 206 |
| Trys. (M.E.T.) Omn. Co. | ,, 9 | ... | 8,915 | ... | 28 | 102,139 | ... |
| Tyneside Trys. & Tmrds | ,, 6 | 552 | 768 | + 216 | 6 | 3,094 | + 255 |
| Wallasey Corporation | ,, 9 | 1,530 | 1,794 | + 264 | 19 | 24,081 | + 1,892 |
| Walsall Corporation ... | ,, 9 | 739 | 765 | + 26 | 32 | 19,667 | + 1,306 |
| Walthamstow U.D.C.... | ,, 9 | 848 | 999 | + 151 | 19 | 14,519 | — 665 |
| Warrington Corp ..... | ,, 7 | 450 | 461 | + 11 | 19 | 8,358 | + 321 |
| West Ham Corporation | ,, 7 | 2,841 | 3,019 | + 178 | 18 | 51,337 | + 1,272 |
| Wigan Corporation ..... | ,, 7 | 1,474 | 1,644 | + 170 | 18 | 27,381 | + 2,970 |
| Wolverhampton Corp | ,, 13 | 981 | 1,011 | + 30 | 20 | 21,381 | + 1,174 |
| Yorkshire (W. Riding) | ,, 10 | 1,551 | 2,070 | + 519 | 32 | 46,091 | + 5,062 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Wee | Quotations, August 15. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 77 — 80 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | + 1/8 | 4 1/16 — 4 1/8 |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4 1/16 — 4 1/8 |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 91 — 93 |
| 100 | Do. 4½% Deb. Stk. Red..... | + ½ | 95 — 97 |
| 100 | Do. 5% Deb. Stk. Red.... ..... | + ½ | 97½ — 99½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum. Pref ..... | ... | 3/16 — 5/16 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red..... | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac, Co. Ld. 4½% 1st Db. Sk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref ... | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | + 8½ | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | ... | 94 — 96 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 6⅞ — 7⅜ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 97 —100 |
| 10 | Bristol Tramways and Carriage Co. ..... | — ¼ | 5½ — 5¾ xd |
| 10 | Do. do. 4% Cum. Pref. ..... | — ⅛ | 6¾ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | + 1 | 125 —130 |
| 100 | Do. Pref. Ord. Stock ..... | + 1 | 110 —115 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 102½ —105½ |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | ... | 95½ — 97½ |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | + 2 | 78 — 81 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 39 — 42 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 7½ — 9½ |
| 100 | Do. Deferred Ord. Stock ..... | ... | 3½ — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock..... | ... | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 72 — 76 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 89 — 93 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | — 2½ | 96 — 98 xd |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ — 6⅛ |
| 5 | Do do. 5% Cum. Pref. ..... | + 1/8 | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., ... ... ..... | ... | 13/16 — 15/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 100 | Do. 5% Debs. Red. ..... ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5 1/16 — 5 3/16 xd |
| 100 | Do. 4% Debenture Stock Red, 1985 ..... ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. .. | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95 — 97 |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅞ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | — ⅛ | — 11⅛ |
| 10 | Do. do. 6% Pref. ..... | ... | — 12 |
| 100 | Do. do. "A" Red. ..... | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79½ |
| ... | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8½ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | 3/32 — 5/32 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ... ..... | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum. Pref..... | ... | 6¼ — 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2⅛ — 2⅝ |
| 100 | Do. 4% Debenture Stock ..... ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 1/32 — 5/32 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | — ¼ | 33/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¾ — 10¼ xd |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 1 3/32 — 1 5/32 |
| 1 | Do. 6% Cum Pref. ..... | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. .. ... ... ... ... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — 3/8 |
| 100 | London General Omnibus Company, Limited 4½% Deb. | + 1½ | 96 — 98 |
| 100 | Do. Do 5% Cum, Inc, Deb. Stk. Red. | ... | 88 — 90 xd |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | + 1 | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum, Pref ..... .. | ... | 4¾ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | + 4 | 111 —114 |
| $1,000 | Do. do. 5% Bds. .. .. | — 2 | 97 — 99 xd |
| ... | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... .. | ... | 1 1/16 — 1 1/8 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. .. | ... | 84 — 88 |
| 100 | Do. do. 5% Deb. Stock, Red .. | ... | 91 — 94 |
| $100 | Mexico Tramways Co., Common Stock ..... ..... | + 3½ | 99 —101 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | + 5 | 92 — 95 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | + 5 | 92 — 95 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | + ½ | 91½ — 93½ |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. ..... | + 1/32 | 1 3/32 — 1 5/32 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6¾ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 6⅛ — 6⅜ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | + ¼ | 6¼ — 6¾ |
| 5 | Do. do. 6% Cum. Pref. ..... | + ⅛ | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord..... | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 29/32 — 31/32 |
| ... | Do. 5% Cum Pref. ..... | — 1/32 | 1 1/32 — 1 3/32 xd |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim.. Ord. ..... ..... | ... | 31/32 — 1 1/32 |
| 10 | Do. 5% 1st Deb. Stock ..... ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5 % ... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co.. 6% Cum. Pref. .... | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | + 2 | 101½ —103½ |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... ..... | + 2 | 95½ — 97½ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... ..... | + 1 | 101 —103 |
| 10 | Shanghai Elec. Construction Co ..... ..... | ... | 8½ — 9½ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... ... | ... | 85 — 89 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | 5/8 — ¾ |
| 100 | Do. do. 4% Deb. Stk.... .. | ... | 63 — 68 |
| .. | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. .... | ... | 94½ — 96½ |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ... ... | ... | 98 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | + ½ | 88½ — 88⅝ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Deb. Stk. | ... | 83¾ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord..... | ... | 4½ — 5 |
| ... | Do. do. 6% Cum. Pref.... ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | + 1 | 100 —102 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | — ⅛ | 1/16 — 5/8 |
| ... | Do. do. 6% Cum. Pref..... ..... | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 10. | LONDON, SATURDAY, AUGUST 23, 1913. | [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### BOROUGH OF BASINGSTOKE.

ELECTRIC LIGHTING.

The Corporation of Basingstoke invites tenders for the supply and erection of the following plant:—

Section A.—Diesel Generators, Balancer Set and Booster Set.
" B.—Storage Batteries.
" C.—Switchboard and Instruments.
" D.—Cables and Cable Laying.
" E.—Overhead Travelling Crane.

Contractors may tender for any section, but not for part of a section.

Particulars of the above sections, together with general conditions and forms of tender, are bound up in one specification, and may be obtained at the office of the undersigned on payment of three guineas, which sum will be refunded on the return of the specification filled up with a *bonâ-fide* tender, which shall not subsequently be withdrawn.

Duplicate specifications can be obtained at an additional cost of half a guinea each, not returnable.

Tenders, endorsed "Electric Lighting," must be delivered by 5 p.m. on Wednesday, September 17, 1913.

The Corporation does not bind itself to accept the lowest or any tender.

F. REGINALD PHIPPS, A.M.Inst.C.E., F.S.I.,
Borough Engineer.

Town Hall, Basingstoke,
August 14, 1913.

### BOROUGH OF HAMMERSMITH.

The Borough Council invites tenders for the supply of:—

(*a*) High and Low Tension Underground Electric Supply Cables.

(*b*) High Tension Sub-Station Switchgear

Copies of specification, form of tender, and further particulars may be obtained from Mr. G. G. Bell, Engineer and Manager, 85, Fulham Palace Road, Hammersmith, London, W.

Sealed tenders, endorsed "Tender for Cables" or "Tender for Switchgear," must be delivered to me at the Town Hall, Hammersmith, not later than 4 p.m. on Wednesday, September 24, 1913.

The Council does not bind itself to accept the lowest or any tender.

LESLIE GORDON,
Town Clerk.

Town Hall, Hammersmith, W.,
August 21, 1913.

### GAINSBOROUGH URBAN DISTRICT COUNCIL.

PETROL MOTOR FIRE ENGINE.

The above Council are prepared to receive tenders for the supply of a new Steam or Petrol Motor Fire Engine, capacity 350 to 450 gallons per minute.

Further particulars may be obtained upon application to S. W. Parker, Engineer and Surveyor.

DECIMUS M. ROBBS,
Clerk to the Council.

Council Offices, August 16, 1913.

### CITY OF CARDIFF.

The Cardiff Corporation invite tenders for the supply, delivery, and erection of the following plant at their Roath Power Station:

1. A 2,000 kw. Turbine Alternator with Surface-Condensing Plant and Auxiliaries.
2. A 700 kw. Rotary Converter.
3. Boiler House Plant in three Sections. Tenders will be considered for either Section, but not for a portion only of a Section.

Section (a). Water-Tube Boilers, Superheaters, Stokers, etc.
Section (b). Turbine-Driven Feed Pump and Heater.
Section (c). Fuel Economiser.

Specification and forms of tender may be obtained from Mr. Arthur Ellis, City Electrical Engineer and Manager, Central Offices, The Hayes, Cardiff, on payment of a deposit fee of one guinea for either of the three specifications, which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be had if desired at a charge of 5s. 0d. per copy, which will not be refunded.

Sealed tenders, endorsed "Electrical Extensions, Section —," to be delivered to the undersigned not later than noon on Friday, September 12, 1913.

J. L. WHEATLEY
Town Clerk.

City Hall, Cardiff,
August, 1913.

### EDINBURGH CORPORATION.

ELECTRICITY SUPPLY.

The Lord Provost, Magistrates, and Council invite tenders for the following work in connection with their Electricity Supply Station at MacDonald Road:—

Specification No. 27.—Two Mixed Pressure Steam Turbines and Direct Current Generating Plant; each set to be of 1,500 kw. capacity.

Copies of the specification, form of tender, general conditions, and drawing can be obtained from the Engineer, Dewar Place, Edinburgh, on and after Wednesday, August 27, on payment of a deposit of £2 2s., which deposit will be refunded on receipt of a *bonâ fide* tender, and on the return of the specification, general conditions, and drawing. The specification, general conditions, and drawing may be seen at, but not obtained from, the office of Sir A. B. W. Kennedy, 17, Victoria Street, London, S.W.

Tenders, on the prescribed form, enclosed in sealed envelopes, and endorsed on the outside "Electricity Supply, Tender to Specification No. 27," must be delivered at the office of the undersigned not later than the 22nd day of September next.

THOS. HUNTER, LL.D., W.S.,
Town Clerk.

City Chambers, Edinburgh,
August 19, 1913.

### THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

Tie Bars, Gibs and Cotters.
Steel Rails and Fishplates.
Steel Fishbolts, etc.
Cast Iron Sleepers.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in sealed envelopes, addressed to the undersigned, marked "Tender for Tie Bars, Gibs, and Cotters," or as the case may be, not later than 11 o'clock a.m. on Thursday, September 4, 1913.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.,
August 21, 1913.

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## COUNTY OF LONDON.

The London County Council invites tenders for additional Main High-Tension Switchgear, including the reconstruction of existing Main High Tension Switchgear at the Council's Generating Station, Greenwich.

Persons desiring to submit tenders may obtain the specifications, bills of quantities, form of tender, etc., on application to the Clerk of the Council, at the County Hall, Spring Gardens, S.W., upon payment to the Cashier of the Council of the sum of £2. This amount will be returnable only if the tenderer shall have sent in a *bonâ fide* tender, and shall not have withdrawn the same. Full particulars of the work may be obtained on personal application, and the drawings, specification, and other contract documents may be inspected at the County Hall before the payment of the fee.

The contractor will be bound to pay to all workmen employed by him in and about the execution of the contract, or any part thereof, wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list, and such rates of wages and hours of labour will be inserted in and form part of the contract by way of schedule. Full particulars of the Council's Standing Orders on these matters are given in the *London County Council Gazette*. Tenders must be upon the official forms, and the instructions therein must be strictly complied with. No tender received after 11 a.m on Tuesday, September 23, 1913, will be considered.

The Council does not bind itself to accept the lowest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
August 16, 1913.

## COUNTY BOROUGH OF SOUTHAMPTON.

TO TAILORS AND OTHERS

The Corporation invite tenders for the supply of about 180 pairs of Blue Serge Trousers suitable for winter wear for the employees of the Tramways Department.

Form of tender, with conditions and particulars, may be obtained and pattern inspected at the Tramway Offices, Above Bar Street.

Sealed tenders on the printed form, endorsed "Tender for Tramway Uniforms," must be left at the Town Clerk's Office by 12 o'clock at noon on the 30th instant.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
August 15, 1913.

(*Continued on page* 179)

**TRAMWAY SUPPLIES, Ltd.,**
**Tramway Engineers,**
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
**160, WOODHOUSE LANE, LEEDS.**
Sole Manufacturers of
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Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.
Robert KEARSLEY & Co., Ltd.
RIPON, England.

**MILLARS' TIMBER AND TRADING CO., LTD.**
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON." Telephone: 368, LONDON WALL.

**SIMPLEX CONDUITS, Ltd.**
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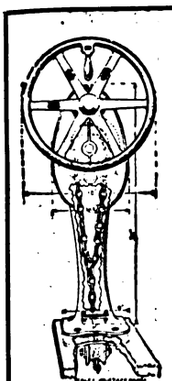

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BRANCH OFFICES AND AGENCIES Established at Brussels, Christiania, and Stockholm.

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THE
# Tramway AND Railway World

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**One Shilling per Single Copy.**

**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, AUGUST 23, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## EXCESS PASSENGERS IN TRAM CARS.

Slowly and by degrees the London County Council are winning for their tramway system some of the privileges which have for years been freely accorded tramways outside of the metropolitan area. If it were not for the serious consequences, the situation would be farcical. Here we have by far the biggest tramway undertaking in the country—and one, moreover, worked not by a dividend-seeking company but by a local authority—bound in shackles by rigid police regulations in regard to matters in which other tramway undertakings have freedom. In other parts of the country when it becomes apparent to a tramway authority that it would be advantageous to the undertaking and to the public that some local restriction should be removed or that some change should be made, say, in the structure of cars, the thing is done. If the tramway is worked by the local authority that body makes the change by its own volition. If a company runs the cars it negotiates with the local authority, and an agreement is usually possible. But in London the Commissioner of Metropolitan Police has autocratic powers, and he and his advisers refuse to make any changes in by-laws which are relics of old times when conditions were wholly different. The latest change, authority for which has been obtained only after long opposition, and which came into force last Saturday, is to allow excess passengers up to about 10 to stand in a car during inclement weather and on holidays and special occasions. This concession, granted all over the country years ago, has all along been strongly opposed by the London police authorities, just as if the cars were still drawn by horses. The ice was broken some time ago when owing to a break-down at the tramway power station the services of cars had to be restricted, and the Board of Trade granted the concession temporarily till the full services could be resumed. The question arose also in connection with the inauguration of through running with outside tramway systems which already had the power to carry excess passengers. Yet the County Council could only get over the police objection by obtaining the desired authority in their Tramways Act which became law on August 15. On the following day notices were put up in the cars announcing that on the specified occasions excess passengers up to one-third of the number for whom seats are provided on the lower deck may be carried. There will now be a chance for passengers during the busy hours getting into cars at intermediate points. For this simple boon an Act of Parliament was required! There may be some trouble at first between passengers and conductors as to what constitutes inclement weather, as a hard and fast line between good weather and bad is not easy to draw. The management of the tramways, after a little experience should get over that, and they will also have to try to harmonise the police definition and the tramway definition of inclement weather. If the authorities of Scotland Yard were more closely in touch with the needs of the users of the tramways there would be little reason to apprehend any trouble on this account.

## SELECT COMMITTEE ON MOTOR TRAFFIC.

*To the Editor of* THE TRAMWAY AND RAILWAY WORLD.

SIR,—Although I am on holidays, I cannot refrain from saying that I have read the recently issued report of the Select Committee on Motor Traffic, and must admit I am somewhat disappointed at the conclusions and recommendations arrived at. I am much afraid in view of the numerous authorities who will have a finger in the pie, so to speak, that the Committee's recommendations will add another fatuity to the existing muddle. A properly constituted Traffic Board, really desirous of meeting the convenience of the travelling public, with due regard to public safety, and—"not swayed by electoral considerations, either of a metropolitan or local character"—could, and should, be able to deal with all traffic matters. Centralised control of some sort *is* an admitted necessity. I have, with others concerned in the Metropolitan transportation business, always contended that the proper solution of the difficulties was the appointment of a Central Traffic Board—as independent of other authorities as the Water Board, for instance—and which should be possessed of large controlling powers over the different forms of locomotion, and am firmly of opinion that the only permanent and equitable solution for the adjustment of *all* conflicting interests would be the establishment of an independent Traffic Branch, instead of the proposed new branch of the Board of Trade.

Yours faithfully,
T. B. GOODYER.

Gorleston-on-Sea, August 18, 1913.

## LONDON MOTOR TRAFFIC.

THE POSITION AND OPINIONS OF MR. W. W. BEAUMONT.

In the House of Commons, a few days before the close of the Session, Mr. FRED HALL (Dulwich—U.) asked the Secretary of State for the Home Department if Mr. W. Worby Beaumont, who acted as adviser to the Commissioner of Police in regard to the construction of licensed motor vehicles, was also consulting engineer to any omnibus company running licensed vehicles in the Metropolitan police area; if so, the dates when he took up these respective positions; what were the duties he performed in regard to motor vehicles, and did these duties include the supervision of tramcar design; if Mr. Beaumont had expressed any opinion as to the advantages or disadvantages of tramways as a means of urban street transit; and, if so, whether this opinion was expressed in his capacity as adviser to the police or to the omnibus companies.

Mr. MCKENNA replied: Mr. Worby Beaumont has been adviser to the Commissioner of Police in regard to the construction of licensed motor vehicles since November, 1905. His duties, which are advisory only, do not include the supervision of tramcar or of omnibus or of cab design, but he is consulted on technical engineering points affecting the construction of cabs and omnibuses, and occasionally of tramcars. I believe that Mr. Beaumont has for many years given public expression to his personal views as to the advantages or disadvantages of various means of street transit, but these are his personal views only, and he has not been asked to express any opinion in an official capacity. Mr. Beaumont at the time of his appointment as adviser to the Commissioner of Police was, I believe, already consulting engineer to all the motor omnibus companies then plying in London, and also to various tramway undertakings in London and elsewhere.

It will be remembered that the Select Committee considered that the technical adviser to the Chief Commissioner should be an independent official.

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## ROAD MAINTENANCE IN LONDON.

Serious Effect of Motor Traffic.

The Metropolitan Paving Committee have received replies from the surveyors of the Metropolitan Boroughs on the subject of strengthening the foundations of roads. The Committee had been informed that in order to withstand the greater weight and strain imposed on road foundations due to the increase of motor omnibus and other heavy mechanically propelled vehicle traffic it had been found necessary in many cases to increase the thickness of the concrete foundations. From the replies which the Committee have received from the surveyors the following interesting particulars are gathered :—

In the City the existing foundations of the main thoroughfares are not sufficiently strong to withstand the weight and strain imposed on them, and the City engineer considers that the minimum thickness of the concrete foundations should be 9in. In Bermondsey it has been found necessary to increase the thickness from 6in. to 9in., or even 12in., at considerable cost. In Fulham motor traffic has, if anything, decreased the cost of the maintenance of wood-paved roads, or even of roads remade with bituminous macadam. In Finsbury the experience is similar, but in Greenwich it is quite the reverse, for the old concrete foundations are inadequate for the greater weight of vehicles, and the increased load and speed are causing greater vibration. In Hackney the foundations are being doubled in depth, for the usual life of a road is being curtailed, even to the extent of 25 per cent. In Hammersmith increased foundations have become necessary, and the cost of constructing all classes of roads has been added to. In Hampstead the additional cost of road maintenance has been about £5,000 per annum in the last two years. In Holborn the foundations have been doubled. In Lewisham the heavy motor traffic is very materially increasing the cost of road maintenance. In St. Marylebone the foundations have been deepened in the case of wood-paved roads. Macadam roads have had to be re-coated annually. In St. Pancras many wood-paved streets have been injured, and in two cases only £3,800 has had to be spent in making new foundations. On macadam roads the omnibus traffic is terribly destructive. The borough supports the claim of the local authorities that grants should be made by the Road Board from the fund provided by the petrol tax towards the necessary expenditure. In Paddington, Poplar, and Southwark the cost of maintaining the carriage-ways has been advanced. In Westminster for new roads a deeper concrete foundation is being provided, but while the increase of motor traffic prejudicially affects macadam and perhaps, to some slight extent, asphalte roads, there has not been any increase of the cost of maintenance of wood-paved roads. In Woolwich the borough council is considering the advisability of adopting a more durable paving than water-bound macadam and tar-sprayed roads.

## LONDON THROUGH-RUNNING ARRANGEMENTS.

A Trial Run to Hampton Court.

So successful are the through-running arrangements with the Greater London municipal tramways and the Metropolitan Electric Tramways Company in the northern and north-western Middlesex districts of the metropolitan area, that a suggestion has been made for a similar agreement between the London County Council and the London United Electric Tramways Company. The suggested linking up is between the Victoria Embankment and Tooting lines, which terminate at Merton, and the Merton, Wimbledon, Kingston, and Hampton Court section of the company's system. The interchange was originally proposed by the late Sir Clifton Robinson, at whose instigation the company promoted a Bill in Parliament some years ago, to obtain compulsory running powers over the L.C.C. lines to the Embankment. The Bill, however, was rejected.

A large business traffic is exchanged between the two systems, and there is also an extensive Sunday and holiday traffic from London to Hampton Court, notwithstanding the inconvenience of having to change cars at the London County boundary. The late Sir Clifton Robinson, chairman of the company, frequently advocated through running, but it has remained for the era of motor-omnibus competition before the London authority could be induced to seriously consider the question. The motor-omnibuses also add to the risks run by tramcar passengers in changing cars, an operation that may also be regarded as leading to unnecessary obstruction of the roadway. Whether through-running arrangements will be made is at present uncertain, but a hopeful indication may be drawn from the fact that on August 14 a London car fitted with an overhead trolley was run on to the company's track at midnight and travelled to Hampton Court and back. The journey of twenty miles or so was made without a hitch, the track being adapted for bogey cars as heavy as those of the County Council. Officials of both undertakings took part in the novel run to the Thames-side pleasure resort.

A Modification of the Leyton Agreement.

Leyton Urban Council have secured a modification of the agreement with the London County Council for through running on the Lea Bridge Road route. The receipts for cars on the through route are to be pooled and divided according to the mileage run by each authority, for a period of three months from August 1 last. The proportion of mileage run by each authority is to be on the same basis as at present.

## TRAMWAY LABOUR AGITATIONS.

An Amalgamation of Unions.

The Parliamentary Committee of the Trades Union Congress have sanctioned a proposal for an amalgamation of trades unions connected with vehicular workers, and a conference to arrange details has been convened for September 24 at Manchester. The scheme affects the Amalgamated Society of Tramway and Vehicle Workers, London and Provincial Union of Licensed Vehicle Workers, National Union of Vehicle Workers, United Carters' Association, and the Carters, Lorry and Motormen's Union, and their approximate membership is 100,000. The proposal is the outcome of the London taxi cab strike, in which it was found that the success of the men was delayed by the ease with which the travelling public were able to resort to tramcars and omnibuses when the supply of taxi cabs failed. It is also proposed to form an alliance with the National Union of Railwaymen if the present scheme proves successful.

Nottingham.—Several matters affecting the Corporation tramway workers have been forwarded for the consideration of the Tramways Committee. These include a petition, signed by about 320 motormen and conductors, against the bonus system for power saving; an application for permission to wear the union badge in uniform or otherwise; and the provision of wind-screens.

Ashton-under-Lyne.—Alderman Jackson, secretary of the Tramway and Vehicle Workers' Union, accompanied a deputation of the men which on August 16 met representatives of the three tramway authorities. The men had asked for another ½d. an hour all round for drivers and conductors, and the employers had offered a farthing to the drivers and a halfpenny to the conductors, but only to men of five years' service. The employees have decided to hand in their notices this week.

Rochdale.—The tramway workers have been granted an increase of wages equivalent to a farthing per hour, the motormen to reach a maximum of 7d. per hour after five years' service, and the conductors 6½d. after five years' service. They are also to receive wages at the rate of time and a quarter for work on Christmas Day; but the committee cannot see their way to pay time and a half for all time worked over eleven hours per day. The men have decided to ask that the maximum wage should be reached after four years' service.

Dublin.—The following notice was issued on August 12 by the directors of the Tramways Company :—"It has come to the knowledge of the directors that demands prepared by Mr. James Larkin are to be sent to the board by some of the traffic employees, under the pretence that they are coming from the body of the men. As no consideration will be given to any communication coming from Mr. Larkin or his union, his agents might save themselves the trouble of sending them in." It is claimed on behalf of the Transport Union that when a strike is declared a stoppage of the service will be brought about by the withdrawal of the power house men.

Sheffield.—As he would not be able to be present at the September meeting of the City Council, Sir Wm. Clegg, chairman of the Tramways Committee, read a statement at the August meeting in regard to the men's demands about to be submitted to an arbitrator. No body of employees, he said, had better conditions than the tramwaymen, and expressed his surprise and regret at their dissatisfaction and the "unwarranted threats" their leaders had indulged in. He uttered a grave warning as to the risk of the forfeiture of their privileges the men would have run had they gone to the extremity of a strike. The generosity and goodwill of the committee had apparently been construed as weakness, and he added, "it may be that in the future the committee may have to reconsider its policy." The Tramways Committee did not want dissatisfied servants, and those who thought they were unfairly treated were at liberty to terminate their engagements; they were determined to be masters in their own house. The only criticism came from Councillor Holmshaw, who, amid some dissent, interpreted Sir William's doctrine to mean that workmen must not make any effort to improve their position.

## NEW AND PROSPECTIVE WORK.

Dublin.—The Tramways Company have decided to at once relay some of the lines which they had not intended to proceed with until next year. The reason for the decision is the greater dearth of employment in the city for casual labour.

Dunfermline.—The Dunfermline District Tramway Company have decided to carry their tramway system through Dunfermline to the western boundary of the burgh. When the Company obtained their powers it was a condition that they pay the Corporation £100 per mile in respect of the upkeep of the tramway track. As an incentive to the Company to carry out the extension the Council have agreed to reduce the payment to £60 for a period of five years.

Morecambe.—The Town Council, on August 19, agreed that the electrical engineer should prepare a scheme for the electrification of the tramways.

Stirling.—The Council have decided to consider a proposal made by Mr. George Balfour, of Messrs. Balfour, Beatty, and Co., London, to acquire the Stirling and Bridge of Allan Tramways and to apply for powers to enable them to reconstruct and electrify the lines. Mr. Balfour states that he could only carry out the scheme on condition that he was able to acquire the electricity works from the Corporation, when he would reduce the charge for domestic and public lighting.

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## RAILLESS TRACTION AT RAMSBOTTOM.

The first railless trolley traction installation in Lancashire was inaugurated on August 14 at Ramsbottom, as reported in our issue of August 16. The Board of Trade inspection was made by Major Druitt and Mr. Trotter. The total distance is 3½ miles, and the through fare will be threepence. The car started from the railway station and ran to Holcombe Brook and Edenfield, the passengers also including Councillor Wilkinson (chairman of Ramsbottom Urban Council), Mr. J. B. Hamilton, Mr. Jekin (assistant consulting engineer), Mr. W. Clough (manager, Bury Tramways), Mr. C. Z. E. Stewart (manager, Rawtenstall Tramways), Mr. Clough (Clough, Smith and Co., of London, overhead contractors), Mr. E. M. Munroe (of the R.E.T. Construction Company, Limited), and Mr. J. Wild (manager of the Ramsbottom Tramways). The last-named was the driver of the first car. The inspecting officers found that the system generally was satisfactory, and gave permission for immediate working of two cars. Two other cars were expected to arrive before the end of the month, when a more frequent service than a half-hourly one was expected to be introduced. Each car has the R.E.T. Construction Company's double trolley of the under-running type, which allows the vehicle a radius of 16 feet from the centre of the trolley wires, of which there are four, in order that the car may be driven over the whole of the roadway. The car is driven by two 20 horse-power motors, and as it is driven only from one end at each of the three termini the overhead wires are in the form of part of a circle to enable the cars to be turned. The maximum weight of a car when loaded is five tons. Messrs. Siemens supplied the electrical equipment, Messrs. Brown, of Huddersfield, constructed the chasses, and the bodies were built by Milnes Voss and Co., Birkenhead, the whole of the work being under the supervision of the R.E.T. Construction Company. The current is supplied by the Lancashire Electric Power Company, at a pressure of 10,000 volts, which is converted to 500 volts in a small sub-station adjoining the new car depôt in Stubbins Lane. The car shed will accommodate six cars, and there are also repair shops, store rooms, mess rooms, and offices.

## CAR REPAIR COSTS.

Some time ago Mr. N. J. Young, general manager of the Newport Corporation tramways department, obtained information in reference to the cost of car repairs on various tramways, and the statement is included as an appendix to his annual report. We give below the figures for the last two years :—

| Name of Town. | Total No. of Cars. | | Total cost of car repairs and maintenance per car per annum. | |
|---|---|---|---|---|
| | 1910-11 | 1911-12 | 1910-11 | 1911-12 |
| Aberdeen ... ... (14) ... | 71 | 71 | £35 | £35 |
| Belfast ... ... (8) ... | 243 | 250 | 61 | 61 |
| Birkenhead ... ... (12) ... | 59 | 59 | 73 | 79 |
| Birmingham ... ... (6) ... | 300 | 460 | 68 | 54 |
| Blackburn ... ... (14) ... | 61 | 61 | 61 | 69 |
| Bolton ... ... (13) ... | 106 | 106 | 85 | 113 |
| Bradford ... ... (15) ... | 237 | 240 | 81 | 88 |
| Burnley ... ... ... (12) ... | 57 | 57 | 64 | 67 |
| Cardiff ... ... ... (9) ... | 130 | 130 | 46 | 46 |
| Croydon ... ... ... (11) ... | 70 | 70 | 78 | 85 |
| Derby ... ... ... (9) ... | 47 | 50 | 46 | 53 |
| Dundee ... ... ... (13) ... | 66 | 68 | 58 | 54 |
| Glasgow ... ... ... (12) ... | 803 | 808 | 57 | 59 |
| Halifax ... ... ... (15) ... | 95 | 95 | 51 | 59 |
| Huddersfield ... ... (12) ... | 76 | 76 | 125 | 110 |
| Leeds ... ... ... (16) ... | 282 | 292 | 84 | 76 |
| Leicester ... ... (9) ... | 140 | 140 | 72 | 74 |
| Liverpool ... ... (15) ... | 558 | 572 | 78 | 78 |
| Manchester ... ... (12) ... | 600 | 617 | 96 | 85 |
| Newcastle-upon-Tyne... (12) ... | 190 | 190 | 50 | 65 to 70 |
| Newport ... ... ... (10) ... | 44 | 44 | 67 | 85 |
| ,, 1912-1913 ... ... | | 44 | | 94 |
| Oldham .. ... ... (11) ... | 80 | 92 | 97 | 83 |
| Portsmouth ... ... (12) ... | 100 | 100 | 48 | 46 |
| Preston ... ... (9) ... | 30 | 30 | 94 | 110 |
| Rochdale ... ... (11) ... | 59 | 59 | 57 | 70 |
| Salford ... ... ... (12) ... | 200 | 200 | 68 | 70 |
| Sheffield ... ... ... (14) ... | 264 | 269 | 88 | 92 |
| Sunderland ... ... (13) ... | 70 | 70 | 35 | 39 |
| West Ham ... ... ... (9) ... | 118 | 118 | 69 | 77 |
| Wigan ... ... ... (11) ... | 67 | 67 | 69 | 69 |
| Wolverhampton ... (13) ... | 49 | 49 | 47 | 51 |

The figures in brackets are the number of years Electric Cars have been running.

**First-Class Tramcars.**—The Manchester press appears to be greatly exercised over the question whether Manchester should imitate Liverpool's example and introduce first-class tramway cars. A petition in favour of them has been presented to the Tramways Committee, and will be considered shortly. There seems to be a feeling, however, that the use of such cars would create "an invidious distinction among tramway travellers which would meet with very serious opposition." The ridiculous suggestion is made that it would tend to snobbishness. A member of the Tramways Committee recently said that the policy of the Committee is very much against any distinctive service being adopted; cheaper rides were what they aimed at. People who wanted privileges in riding should pay for them and utilise taxi cabs. To the casual observer it appears that the only phase of the matter with which councillors need concern themselves is covered by the question, Would the innovation pay? If there is a demand for the special service and it appears likely to prove remunerative the Council's course of action is clear.

## MISCELLANEOUS NEWS AND NOTES.

**Barking Council** have arranged with the East Ham Tramways Committee for a supply of current for the Barking tramways.

**Alteration of Halfpenny Stages at Aberdeen.**—While retaining the maximum charge of 1d. from the centre of the city to any terminus on any one car the City Council have lengthened the halfpenny stages from an average distance of 840 yards to 850 yards.

**Ripley to Nottingham Tramways.**—By the opening on August 15 of the Ripley to Crosshill section of the Nottingham to Ripley tramways, the undertaking was inaugurated throughout its whole length. Lieut.-Colonel Druitt, of the Board of Trade, was again the inspecting officer.

**New Cars and Wire Mats for Dundee.**—The Tramways Committee have authorised the manager, Mr. Peter Fisher, to obtain tenders for four additional cars, in view of the extension of the tramways to Broughty Ferry, and to equip all the cars on the system with wire mats, at a cost of £3 18s. per car.

**Rail and Paving Renewals at Brighton.**—The Tramways Committee has agreed to a proposal made by Mr. W. Marsh, the tramways engineer, for the renewal of a portion of the rails and wood paving in London Road early next year, at an estimated cost of £5,000, exclusive of the cost of an 18-inch margin.

**Route Numbers.**—Progress is being made with the work of fixing route numbers, with the necessary equipment for illumination at night, on the electric cars of the London County Council and the Liverpool Corporation. In London the back portion of the illuminated boxes is being utilised as advertisement spaces.

**Dublin Council and the Tramway Company.**—Without discussion the Dublin Corporation on August 18 adopted a resolution by Councillor Partridge, drawn up in best debating society style, instructing the Law Agent and the Town Clerk to report on the steps to be taken in order to acquire the tramways undertaking.

**Greenock Tramways and Municipal Ownership.**—Councillor Mitchell has given notice to move at the next meeting of Greenock Corporation that the Town Clerk give due and further notice to the Greenock and Port-Glasgow Tramways Company that the Corporation have decided to exercise the option they are entitled to in terms of the lease to terminate such lease on the first break, namely, May 15, 1914.

**"Railless" Proposals at Aberdeen.**—The directors of the Aberdeen Suburban Tramways Company have had under consideration the question of extending their operations by the working of trackless cars or other mechanically propelled vehicles, and they are satisfied that this course would not only be profitable in itself but would attract fresh traffic. A resolution to that effect will be submitted at the half-yearly meeting.

**Motor Omnibuses for Crewe.**—At a recent meeting of the Crewe Town Council it was decided to promote a Bill in Parliament to enable the Corporation to run motor omnibuses within the borough and to and from Crewe, Nantwich, Willaston, Haslington, and Sandbach. Some years ago a private company obtained an order to construct light railways in Crewe, but subsequent opposition by the Corporation led to the abandonment of the project. A suggestion was made later that the municipality itself should provide tramways, but this was vetoed at a town's meeting. The town is now served only by horse omnibuses.

**Excess Number of Passengers in London Cars.**—The London County Council (Tramways and Improvements) Act, 1913, received the Royal Assent on August 15, and on the following day a notice was posted in the cars calling the attention of passengers to Clause 27 of that Act, which reads as follows :—"Notwithstanding anything to the contrary contained in any Act, Order, By-law, or Regulation, the Council may, during inclement weather or on Sundays, or Bank or other public holidays, throughout the day, or on Saturdays after twelve o'clock noon, or (with the consent of the Commissioner of Police of the Metropolis) on special occasions, carry inside any carriage used by them on any tramways, an additional number of passengers not exceeding one-third of the number of inside passengers which such carriage is licensed to contain."

**A Compliment to Leeds Tramway Employees.**—A blind passholder writes to a Leeds newspaper thus :—"For some years I have been afflicted with blindness and have had the privilege of a free pass allowed by the Corporation, and I am expressing the sentiments of many of my blind friends when I say that the civility and kindness of our conductors might be equalled but not excelled. As a rider for many years, visiting almost every town and city from Trent to Tweed, I can testify that the Leeds conductors set up a standard for manners, kindness and courtesy which would do credit to many others to follow. I would like Mr. Burgess to have to work some of the heavy short-staged routes and take some of the insults and dirty remarks that are given to the conductors on many occasions when making an effort to get through the almost impossible task of taking the fares."

**New St. Petersburg Car Depots.**—When the first series of tramways was constructed in St. Petersburg, new depôts were not built. The old horse car depots were used. It was quite impossible to effect many of the repairs that became necessary, and cars more than slightly damaged had to be sent to the factories. But with the second series of tramways new car sheds are being built, the largest of which is the Rozhdestvenski depôt which occupies a surface of 102,900 square feet. The car sheds will accommodate 200 cars so disposed as to be examined on all sides with pits between rails for their inspection from below. The buildings are mainly ferro-concrete. Administrative offices three to six stories high are being added. This establishment is expected to be opened in November, when the second series of tramways is to

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be inaugurated. A second depôt, occupying 72,030 square feet is under construction in Bulfovoi Ulitz for 120 cars, where lighter supplementary work will be effected. The Rozhdestvenski car shed alone is estimated to cost £106,250. Five hundred workmen are at present engaged on it.

**Important Proposal Rejected at Glasgow.**—Consideration was given by the City Council on August 14 to a recommendation by the Tramways Committee that application be made for Parliamentary powers to enable them to remove obstructions from the tramway lines, and where it could be shown that the obstruction was due "to the overloading of the vehicle or to negligence in the construction or maintenance thereof," for powers to charge for the cost of the removal and the loss occasioned by the interruption. On a motion to disapprove of the recommendation being proposed and seconded, Bailie Alston said the committee were only seeking powers to recoup themselves for having to bring the apparatus for removing obstructions from the depôt. It was in the interests of other users of the streets that obstructions should be removed as speedily as possible. The minute was disapproved by a large majority.

## CONTRACTS AND ORDERS.

**The Electrical Company's** tender for 70 tramcar watt-hour meters, mounted on special spring frames, has been accepted by Burnley Corporation.

**Wm. Pollitt and Co.** have obtained a contract for the laying of cable conduits in connection with the new generating station of the Bolton Corporation.

**Tudor Accumulator Company, Limited,** have obtained a contract for the repair and maintenance of the battery at the Heywood Corporation electricity works.

**Newport Council** have accepted the tender of Mr. Bertram Thomas for the supply of switchgear at £168, and of Mr R. W. Moon for the erection of a switch and motor house, at £500.

**Sunderland Council** have placed contracts as follow:—Hadfield's Steel Foundry Company, relaying a manganese railway and tramway crossing; Tudor Accumulator Company, Limited, welding 500 tramway rail joints; British Insulated and Helsby Cables, Limited, and I.R. and G.P. Company, cables; Ferranti, Limited, meters.

**Chesterfield Council** have placed contracts as appended:—Marsden Bros., sub-station, Whittington Moor, £205; Chas. Ross, Limited, girders for switch gallery, £44; B.I. and Helsby Cables, Limited, 1,200 yards low-tension triple-concentric armoured cable, £204; Brush Electrical Engineering Company, Limited, two trailer car bodies, £80 each.

## PERSONAL.

**Mr. W. E. Read,** of the Burton Corporation Tramways, has had his salary increased from £130 to £140 per annum.

**Mr. Robert Hammond** leaves England on August 30 on a visit to South Africa, sailing on the "Edinburgh Castle."

**Mr. V. Hutchinson,** formerly of Hobart, has been appointed electrical engineer to the Brunswick Municipality (Vic.).

**Mr. G. B. Wheeler,** of Southport electricity works, has been appointed chief assistant engineer at the Hamilton electricity works.

**Mr. H. Greaves** has been appointed buyer to Ferranti, Limited, in the place of Mr. J. Robinson, who has resigned owing to ill-health.

**Mr. G. G. Deeley** has been appointed senior charge engineer at Southport electricity works, and Mr. S. Pendlebury as assistant mains superintendent.

**Mr. A. Lees,** a motorman in the Ashton-under-Lyne Corporation tramways department, has been appointed cash clerk and ticket inspector out of a number of applicants.

**Mr. Hamylton Rigg** has resigned his position as sales engineer to the Electrical Power Storage Company, to take up similar duties with Edison Accumulators, Limited, of 49, Old Bond Street.

**Mr. George Herman Anger,** managing director of the Anger Manufacturing and Supply Company, of Bank Chambers, Preston, will sail for New York on October 4 by the "Lusitania." The Anger Company are the manufacturers of the Anger improved automatic brake adjuster, a device which is now in use on 129 tramways representing nearly every country of the world. Mr. Anger goes to the United States to attend the convention and exhibition of the Electric Railway Association of the United States, which will be held at Atlantic City from October 11 to 19. The Anger brake adjuster will be shown there by the Ackley Brake and Supply Company of Church Street, New York City, the sole manufacturers and selling agents for the Anger improved automatic brake adjuster in U.S.A., Cuba, Porto Rico, Mexico, Central America, Venezuela, the Philippine Islands, and the West Indies. After the convention Mr. Anger will visit various tramways in Canada, making his headquarters at the company's Toronto office, and will return to England about November 1.

**Mr. A. T. Lambert,** general manager and electrical engineer, Maidstone Corporation tramways, was made the subject of some complimentary remarks at the opening of the new offices at the Barming depôt on August 15. Councillor Lyle, chairman of the Tramways Committee, in the course of remarks made in calling upon the Mayor to open the new offices, observed that the offices had already paid for themselves in that the manager had, since their erection, always been on the spot, and able to direct the men of the depôt in their work. It must have been very detrimental to the undertaking to have the manager in Mill Street, right away from the place where the repairs to the cars were being executed. Mr. Lambert worked hard to make the tramways a success. There were managers who could not tell the men in the workshop what to do, but Mr. Lambert was not a manager of that stamp. He not only knew how to do the work but showed the men how to do it. The Mayor (Councillor Potter) agreed that in Mr. Lambert they had a clever engineer, and one who thoroughly understood his work. The Council wanted him, with the chairman of the committee, to be master of the whole concern.

## FINANCIAL REPORTS AND MEETINGS.

**Oldham, Ashton, and Hyde Electric Tramway Company.**—The directors have declared an interim dividend at the rate of 5 per cent. per annum (5s. per share) on the ordinary shares for the past half-year.

**Bombay Electric Supply and Tramways Company, Limited.**—In the reference to the annual meeting of the Bombay Electric Supply and Tramways Company in our issue of August 2, the rate of dividend was incorrectly stated. The dividend for the year was at the rate of 5 per cent., free of income-tax.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended August 15, 1913, amounted to £53,540. Upon such of the lines as were working both last year and this year the receipts show an increase of £2,743 upon the week.

**Aberdeen Suburban Tramways.**—The report of the Aberdeen Suburban Tramways Company for the half-year to July 31 states that the profit earned amounted to £1,505, and there is a balance of £3,792 at the credit of profit and loss account. The directors recommend adding £2,000 to the renewal and depreciation account, which will then stand at £12,000, payment of a dividend at the rate of 2½ per cent. for the past year on the paid-up capital, and carrying forward £969.

**Sunderland Corporation Tramways.**—For the year 1912-13 the total traffic revenue was £68,507, as against £67,871 in 1912, and the net balance was £13,446, as against £13,063. The traffic receipts had risen from £17,578 in 1898 to £68,507, this figure having only once been exceeded—in 1908, when the receipts were £68,797. After paying interest on capital, £7,228, and income-tax, £476, there was a balance of £22,408 to carry to the appropriation account. It was proposed to apply £10,366 to the repayment of loans, £7,218 to reserve and renewals fund, £400 to Wheat Sheaf offices, £352 to capital work, £476 to income-tax, and £5,000 for the relief of the rates, this latter contribution making £42,027 given for this purpose since the Corporation took the system over. The amount in the reserves, renewals, and compensation fund was £31,883. The average working expenses per car mile, including cost of power, amounted to 6.33d.

**An Opening for Electrification.**—At the quarterly meeting of the Wicklow County Council, the County Surveyor reported having carried out the annual inspection of the Dublin and Blessington Steam Tramway. In giving the financial results for the past year he said the increased receipts obtained by giving a better service, when there was an opening for such, were altogether eaten up by the fuel bill, and when the cost at 3s. 9d. per tram mile of the electrically-worked Lucan Tramway was compared with 19s. 6d. per mile of the Blessington line, it was easy to understand why the counties had to contribute. There was nothing for it but to try to have some change made on the line, and it would be in the Council's favour if the line were worked by electricity. Mr. Walsh asked: Would the County Council, as the largest guarantors, enforce the sale of the line to any company willing to take it up? The Surveyor: I cannot tell you. It is wrapped up in the law. Mr. McCarroll said the matter was in the hands of a committee who were doing their best in the interests of the Council. The report was referred to this committee.

**Wigan and the Rating Question.**—In his report for the year ended March 31, Mr. F. Buckley, the traffic manager of the Wigan Corporation tramways, says:—"The returns have been of a highly satisfactory character, inasmuch as a profit of £1,178 has accrued, as against a deficit of £4,089 during the year 1911-12. The receipts amounted to £71,268, as compared with £66,328 for the previous year, an increase of £4,939. The average receipts per car mile amounted to 11.80d., as against 11d. during last year, an increase of .80d. per car mile. The consumption of electrical energy for traction purposes during the year again shows a decrease. The total number of units consumed was 2,132,384, or 1.47 units per car mile. The corresponding figures for the previous year were 2,190,122 units and 1.51 units per car mile—a decrease this year of 57,738 units, or 2.7 per cent." Passengers totalled 13,018,833, an increase of 906,500. Unfortunately, it appeared from the remarks made by Alderman Ashton in moving the adoption of the report, that the reduction in the rating accounted for nearly £1,000. Speaking before the decision of the House of Lords was announced in the matter of the rating appeal, Tottenham Council *v.* the Metropolitan Tramways Company, he said he did not think they would ever be called upon to pay that. One never knew what would happen. One court decided one thing, and a second court another. He thought the committee had done wisely in putting that balance in hand to the reserve fund. Councillor Bradshaw in seconding the motion for the adoption of the report, said it was remarkable that the difference in the total increase of revenue had taken place in the last six months, since the change in the management.—Hindley Council on August 15, in consequence of the House of Lords' decision that tramways were rateable at full, decided to make demands

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against the South Lancashire Tramways and the Wigan Corporation Tramways for the balances of rates for June, 1912, and June, 1913.

**Newport Corporation Tramways.**—The report of Messrs. N. J. Young, general manager, and A. Nichols Moore, borough electrical engineer, for the year ended March 31, 1913, is summarised below :—

| | 1912-13. £ s. d. | 1911-12. £ s. d. |
|---|---|---|
| Traffic receipts | 37,555 4 7 | 36,360 12 6 |
| Other receipts | 994 11 6 | 821 9 11 |
| Total income | 38,549 16 1 | 37,182 2 5 |
| Working expenses | 31,670 13 7 | 26,528 8 1 |
| Balance, being gross profit | 6,879 2 6 | 10,653 14 4 |
| Add accrued interest | 808 9 10 | 904 9 2 |
| | 7,687 12 4 | 11,558 3 6 |

Out of which the following charges have been met :—

| | | |
|---|---|---|
| Interest on capital | 5,817 14 6 | 6,144 16 10 |
| Sinking fund | 4,196 16 11 | 4,074 12 1 |
| | 10,014 11 5 | 10,219 8 11 |
| Leaving a balance of | — | 1 338 14 7 |
| Leaving a deficiency of | 2,236 19 1 | — |

The receipts show an increase of £1,367, which was obtained in spite of the curtailment of the service during the coal strike. Although 46,000 additional car miles were run, making a total of 668,067, the cost of energy decreased by about £626. The consumption of energy per car mile is now 1.28 units, as compared with 1.51 in the previous year. Repairs of the permanent way and reconstruction of the tramcars are accountable for an increased expenditure. During the year a good deal of No. 0 trolley wire has been replaced by No. 00 wire, and automatic points have been installed, with satisfactory results. The average total revenue per car mile is 9.55d., and the expenses 7.85d. The Corporation now has 44 cars.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended August 16 amounted to £248,668, or £13,835 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £91 13s. 10d. per track mile, an increase of £3 8s. 2d. per mile as compared with last year.

(*Continued from page* 174.)

### RAMSBOTTOM RAILLESS ELECTRIC TRACTION.

Tenders are invited for the supply of a Tower Wagon, height when lowered 13 feet 6 inches, and when extended 21 feet.

Tenders, giving particulars as to height and as to class of wood, to be forwarded to the undersigned by 9 a.m. on Thursday, the 28th instant.

JOHN W. BARLOW,
Clerk.

Council Offices, Ramsbottom.

### CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF ELECTRICITY RECORDING METERS AND MAXIMUM DEMAND INDICATORS.

Tenders are invited for the supply of Electricity Recording Meters and Maximum Demand Indicators.

Copies of specification, conditions of contract, and form of tender can be obtained on application to the undersigned.

Applications must be accompanied by a deposit of 5s., which will be returned on receipt of a *bonâ fide* tender.

Tenders should be sent to the undersigned, endorsed "Tenders for Electricity Recording Meters," and must be received by them not later than noon of Tuesday, September 9, 1913.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

McILWRAITH, McEACHARN AND CO. PPTY., LTD.,
Billiter Square Buildings, London, E.C.,
Agents for the Melbourne City Council.

### BOROUGH OF ROYAL TUNBRIDGE WELLS.

ELECTRIC SUPPLY DEPARTMENT.

The Corporation is prepared to receive tenders for the supply and delivery of High and Low Tension Cables during the ensuing twelve months.

Specifications can be obtained from the Borough Electrical Engineer, Stanley Road, Tunbridge Wells.

The Corporation does not bind itself to accept the lowest or any tender.

Tenders, sealed and endorsed "Tender for Cables," should be addressed to the Town Clerk, Town Hall, Tunbridge Wells, and delivered not later than the 13th September, 1913.

By order, W. C. CRIPPS,
Town Clerk.

Town Hall, Tunbridge Wells,
August 15, 1913.

## COPPER AND ALUMINIUM MARKET.

August 22, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, August 22. £ s. d. | Last week. £ s. d. | A Year Ago. £ s. d. |
|---|---|---|---|
| Standard Copper (cash) | 68 10 0 | 69 15 0 | 79 8 0 |
| ,, ,, (three months) | 68 10 0 | 69 15 0 | 79 7 6 |
| Electrolytic Copper—bars or ingots | 72 10 0 | 72 15 0 | 81 10 0 |
| Aluminium—bars or ingots | 86 10 0 | 86 10 0 | 77 0 0 |

## COAL MARKET.

August 22, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, August 22. s. d. | Last Week. s. d. | A Year Ago. s. d. | Two Years Ago. s. d. |
|---|---|---|---|---|
| London, free into barge in Thames— | | | | |
| Best Admiralty Welsh (large) | 25 6 | 25 6 | 22 6 | 23 3 |
| Best Seconds | 24 9 | 24 9 | 21 0 | 22 0 |
| Ordinary Drys | 21 0 | 21 0 | 20 3 | 19 3 |
| Best Washed Nuts | 21 0 | 21 0 | 19 0 | 18 9 |
| Best Washed Peas | 19 6 | 19 6 | 17 6 | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) | 21 0 | 21 0 | 17 6 | 19 3 |
| Best Seconds | 20 3 | 20 3 | 16 0 | 18 0 |
| Ordinary Drys | 16 6 | 16 6 | 15 3 | 15 3 |
| Best Washed Nuts | 16 6 | 16 6 | 14 0 | 14 9 |
| Best Washed Peas | 15 b | 15 0 | 12 6 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams | 15 6 | 15 6 | 14 0 | Rail- |
| Best Seconds | 13 9 | 13 6 | 12 4½ | way |
| Smalls | 9 6 | 10 0 | 9 6 | Strike. |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Aug. 19 | £47,164 | £53,967 | 33 | £1,884,144 | +£163,846 |
| Auckland (28 days) | Aug. 1 | 18,853 | 18,960 | 4 | 22,067 | + 209 |
| Ballarat and Bendigo | July 6 | 777 | 789 | 14 | 12,783 | — 113 |
| Bombay | July 25 | 2,558 | 2,867 | 30 | 93,101 | + 3,938 |
| Brazilian St. Rly. Mirs. | July | 41,756 | 49,056 | 52 | 545,185 | + 24,923 |
| Brazilian Traction | Aug. 9 | 85,599 | 97,049 | 32 | 2,823,904 | + 420,988 |
| Brisbane | July | 23,060 | 26,205 | 30 | 177,208 | + 46,494 |
| British Columbia $ | June | 498,206 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | June | 5,985 | 6,249 | 26 | 39,560 | + 1,361 |
| Buenos Aires Lacroze | July | 42,052 | 45,324 | 4 | 45,324 | + 3,272 |
| Calcutta Rs. | Aug. 16 | 60,990 | 66,096 | 33 | 20,95,932 | + 100,281 |
| Cape Town | June | 11,076 | 11,560 | 26 | 75,483 | + 4,640 |
| Carthagena & Herreria | July | 3,350 | 3,794 | 30 | 21,125 | + 6,942 |
| East India | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie | July | 2,993 | 2,796 | 30 | 20,022 | + 1,628 |
| La Plata | July | 3,592 | 4,770 | 30 | 36,342 | + 7,999 |
| Lima | July | 32,259 | 34,410 | 30 | 232,637 | + 10,261 |
| Lisbon Mirs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Aug. 15 | 24,838 | 27,034 | 32 | 402,121 | + 80,254 |
| Melbourne | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico $ | July | 570,619 | 610,602 | 30 | 3,576,142 | + 34,102 |
| Montevideo | July | 25,435 | 29,189 | 39 | 287,602 | + 23,745 |
| Para | Aug. 17 | 3,989 | 3,662 | 37 | 149,814 | + 2,354 |
| Perth (W.A.) | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth | June | 2,974 | 3,268 | 26 | 21,871 | + 6,632 |
| Shanghai $ | Aug. 20 | 19,486 | 24,200 | 33 | 711,252 | + 73,706 |
| Singapore $ | Aug. 16 | 10,108 | 12,790 | 33 | 388,319 | + 45,445 |
| Toronto $ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg $ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London | Aug. 16 | £4,066 | £3,694 | 33 | £162,535 | +£12,249 |
| City and South London | ,, 16 | 2,738 | 2,548 | 33 | 93,068 | — 8,546 |
| Liverpool Overhead | ,, 17 | 1,754 | 1,915 | 33 | 66,516 | + 4,488 |
| London Electric | ,, 16 | 11,085 | 10,995 | 33 | 456,575 | + 5,495 |
| Mersey | ,, 16 | 2,071 | 2,156 | 33 | 73,696 | + 4,866 |
| Metropolitan | ,, 17 | 15,131 | 15,288 | 33 | 552,960 | + 3,444 |
| Metropolitan District | ,, 16 | 10,994 | 11,407 | 33 | 431,331 | + 17,924 |

**DICK, KERR & CO., Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**

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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Aug. 13 | £1,796 | £1,908 | + £112 | 11 | £18,728 | + £1,139 |
| Ayr Corporation ..... | ,, 16 | 550 | 543 | — 7 | 13 | 6,753 | + 508 |
| Bath Electric ..... | ,, 13 | 1,062 | 1,179 | + 117 | 33 | 31,178 | + 1,802 |
| Birkenhead Corp. ..... | ,, 17 | 1,168 | 1,290 | + 122 | 20 | 26,066 | + 2,710 |
| Birmingham Corp. ..... | ,, 16 | 9,774 | 10,637 | + 863 | 20 | 227,293 | + 16,294 |
| Blackburn Corporation | ,, 13 | 1,224 | 1,332 | + 108 | 20 | 26,789 | + 2,199 |
| Blackpool & Fleetwood | ,, 16 | 2,382 | 2,809 | + 427 | 7 | 13,398 | + 1,687 |
| Blackpool Corporation | ,, 14 | 4,206 | 5,062 | + 856 | 19 | 42,251 | + 5,050 |
| Bolton Corporation ..... | ,, 17 | 2,624 | 2,715 | + 91 | 20 | 54,871 | + 2,574 |
| Bournemouth Corp..... | ,, 20 | 2,550 | 3 280 | + 730 | 20 | 45,469 | + 5,163 |
| Bradford Corporation.. | ,, 16 | 5,766 | 5,989 | + 223 | 20 | 119,997 | + 6,442 |
| Brighton Corporation . | ,, 18 | 1,294 | 1,592 | + 298 | 20 | 23,649 | + 941 |
| Bristol ..... | ,, 15 | 7,197 | 8,681 | + 1,484 | 32 | 259,617 | + 35,776 |
| British Elec.Traction – | | | | | | | |
| Airdrie..... | Aug. 15 | 337 | 357 | + 20 | 33 | 11,115 | + 1,594 |
| Barnsley ..... | ,, 15 | 230 | 393 | + 163 | 33 | 9,024 | + 3,385 |
| Barrow ..... | ,, 15 | 503 | 538 | + 35 | 33 | 15,433 | + 903 |
| Birmg.& Mid. Joint– | | | | | | | |
| Birmingham Dist. ... | Aug. 15 | 945 | 912 | — 33 | 33 | 33,147 | + 1,449 |
| Dudley—Stourbridge | ,, 15 | 1,191 | 1,132 | — 59 | 33 | 31,609 | + 2,649 |
| South Staffordshire.. | ,, 15 | 962 | 959 | — 3 | 33 | 32,765 | + 2,281 |
| Wolverhampton Dist. | ,, 15 | 447 | 500 | + 53 | 33 | 16,998 | + 1,274 |
| Devonport ..... | ,, 15 | 552 | 585 | + 33 | 33 | 17,961 | + 320 |
| Gateshead ..... | ,, 15 | 1,055 | 1,568 | + 513 | 33 | 41 292 | + 7,753 |
| Gravesend & N'thfleet | ,, 15 | 239 | 259 | + 20 | 33 | 7,629 | + 910 |
| Greenock—P.Gl'sgow | ,, 15 | 957 | 1,137 | + 180 | 33 | 28,700 | + 2,517 |
| Jarrow ..... | ,, 15 | 143 | 171 | + 28 | 33 | 4,821 | + 362 |
| Kidderminster ..... | ,, 15 | 150 | 165 | + 15 | 33 | 4,173 | + 183 |
| Merthyr ..... | ,, 15 | 227 | 259 | + 32 | 33 | 7,294 | + 840 |
| Metropolitan ..... | ,, 15 | 8,196 | 8,732 | + 536 | 33 | 295 960 | + 7,325 |
| Middleton ..... | ,, 15 | 377 | 402 | + 25 | 33 | 11,683 | + 717 |
| Oldham—Ashton..... | ,, 15 | 638 | 655 | + 17 | 33 | 20,368 | + 448 |
| Peterborough ..... | ,, 15 | 151 | 241 | + 90 | 33 | 5,798 | + 1,300 |
| Potteries ..... | ,, 15 | 1,632 | 1,809 | + 117 | 33 | 68,420 | + 7,483 |
| Rothesay ..... | ,, 15 | 759 | 734 | — 25 | 33 | 8,380 | + 658 |
| Sheerness ..... | ,, 15 | 69 | 76 | + 7 | 33 | 1,763 | + 123 |
| South Metropolitan.. | ,, 15 | 1,117 | 1,148 | + 31 | 33 | 27.649 | — 366 |
| Southport ..... | ,, 15 | 405 | 514 | + 109 | 33 | 10,624 | + 764 |
| Swansea ..... | ,, 15 | 1,273 | 1,383 | + 110 | 33 | 41,448 | + 4,018 |
| Taunton ..... | ,, 15 | 51 | 67 | + 16 | 33 | 1,585 | + 115 |
| Tynemouth..... | ,, 15 | 436 | 512 | + 76 | 33 | 9,034 | + 922 |
| Weston-super-Mare.. | ,, 15 | 432 | 492 | + 60 | 33 | 5,731 | + 997 |
| Worcester ..... | ,, 15 | 334 | 462 | + 128 | 33 | 10.493 | + 847 |
| Wrexham & District.. | ,, 15 | 121 | 151 | + 30 | 33 | 4,032 | + 417 |
| Yorks (Woollen) Dist. | ,, 15 | 1,111 | 1,175 | + 64 | 33 | 37,897 | + 2,794 |
| Burnley Corporation .. | ,, 16 | 1,613 | 1,741 | + 128 | 20 | 34,198 | + 4,690 |
| Burton-on-Trent Corp. | ,, 17 | 287 | 336 | + 49 | 20 | 5,851 | + 189 |
| Bury Corporation..... | ,, 17 | 1,267 | 1,347 | + 80 | 20 | 27,530 | + 852 |
| Cardiff Corporation..... | ,, 2 | 2,545 | 2,955 | + 410 | 18 | 48,759 | + 5,073 |
| Chatham and District.. | ,, 14 | 994 | 1,025 | + 71 | 32 | 29,348 | + 1,968 |
| Chesterfield Corp. ..... | ,, 14 | 221 | 251 | + 30 | 19 | 5,108 | + 633 |
| Colne & Trawden..... | ,, 16 | 289 | 312 | + 23 | 33 | 9,108 | + 574 |
| Cork Electric..... | ,, 14 | 514 | 548 | + 34 | 32 | 16,027 | + 96 |
| Croydon Corporation .. | ,, 1 | 1,774 | 1,657 | — 117 | 17 | 29,570 | — 4,300 |
| Darlington Corporation | ,, 9 | 238 | 266 | + 28 | 19 | 4 749 | + 445 |
| Derby Corporation ..... | ,, 16 | 912 | 1,030 | + 118 | 20 | 19,836 | + 2,171 |
| Dover Corporation .... | ,, 16 | 324 | 350 | + 26 | 20 | 5,085 | — 157 |
| Dublin & Lucan ..... | ,, 15 | 178 | 184 | + 8 | 6 | 1,274 | + 150 |
| Dublin United ..... | ,, 15 | 6,001 | 6,482 | + 481 | 32 | 195,871 | + 5,842 |
| Dundee City ..... | ,, 13 | 1,201 | 1,266 | + 65 | 13 | 17,270 | + 1,472 |
| East Ham Corporation | ,, 16 | 1,057 | 934 | — 123 | 20 | 20 534 | — 695 |
| Exeter Corporation..... | ,, 15 | 353 | 400 | + 47 | 20 | 7,052 | + 237 |
| Gearless Motor 'Buses. | ,, 16 | ... | 576 | ... | 19 | 8,464 | ... |
| Glasgow Corporation .. | ,, 16 | 18,196 | 19,753 | + 1,557 | 11 | 216,368 | + 15,713 |
| Gloseop(U.Elec.Supply) | ,, 16 | 134 | 141 | + 7 | 33 | 4,249 | + 483 |
| Halifax Corporation ... | ,, 12 | 2,397 | 2,461 | + 64 | 19 | 42,005 | + 178 |
| Hastings & District..... | ,, 14 | 1,545 | 1,775 | + 231 | 33 | 32,674 | + 2,023 |
| Huddersfield Corp..... | ,, 16 | 2,064 | 2,197 | + 133 | 20 | 43,081 | + 2,719 |
| Hull Corporation ..... | ,, 16 | 2,945 | 2,994 | + 49 | 20 | 60,893 | + 3,101 |
| Ilford U.D.C. ..... | ,, 16 | 456 | 430 | — 26 | 20 | 9,229 | — 1,589 |
| Ilkeston Corporation .. | ,, 20 | 130 | 139 | + 9 | 21 | 2,755 | + 522 |
| Ipswich Corporation .. | ,, 16 | 531 | 571 | + 40 | 17 | 9,523 | + 83 |
| Isle of Thanet I..... | ,, 16 | 2,052 | 2,112 | + 60 | 46 | 27,343 | + 947 |
| Kilmarnock Corp. ..... | ,, 16 | 155 | 162 | + 7 | 13 | 2,470 | + 168 |
| Lanarkshire ..... | ,, 14 | 1 612 | 1,698 | + 86 | 32 | 53,368 | + 6,824 |
| Lancashire United ..... | ,, 13 | 1,474 | 1,628 | + 154 | 32 | 48 503 | + 4,980 |
| Leeds City ..... | ,, 16 | 7,603 | 7,899 | + 296 | 20 | 166,574 | + 10,834 |
| Leicester Corporation.. | ,, 16 | 2,382 | 2,670 | + 288 | 33 | 91,508 | + 8,472 |
| Leith Corporation ..... | ,, 16 | 750 | 725 | — 25 | 13 | 10.001 | + 212 |
| Liverpool Corporation.. | ,, 16 | 12,177 | 13 462 | + 1,285 | 32 | 421,447 | + 30,562 |
| Llandudno & Colwyn B. | ,, 15 | 917 | 987 | + 70 | 37 | 11,891 | + 1,057 |
| London County Council | ,, 13 | 38,798 | 38,450 | — 348 | 19 | 813,871 | — 22.052 |
| London Gnl. Omnibus.. | ,, 16 | 52,375 | 61,896 | + 9,521 | 33 | 2,049,774 | + 436.624 |
| London United ..... | ,, 15 | 6,208 | 6,875 | + 667 | 33 | 206,236 | — 132 |
| Lowestoft Corporation | ,, 16 | 498 | 505 | + 7 | 45 | 8,933 | + 227 |
| Maidstone Corporation | ,, 14 | 205 | 212 | + 7 | 20 | 4,147 | + 204 |
| Manchester Corp..... | ,, 16 | 16.269 | 16,975 | + 706 | 20 | 352,340 | + 17.148 |
| Nelson Corporation..... | ,, 16 | 2'1 | 227 | + 16 | 20 | 4,243 | + 217 |
| N'castle-on-Tyne Corp. | ,, 16 | 4 102 | 4,583 | + 481 | 20 | 95,989 | + 8,114 |
| Newport (Mon.) Corp.... | ,, 2 | 738 | 831 | + 93 | 18 | 13.444 | + 8'6 |
| New St. Helens & Dist... | ,, 13 | 840 | 904 | + 64 | 7 | 6,381 | + 816 |
| NorthamptonCorp ..... | ,, 15 | 500 | 577 | + 77 | 19 | 11,593 | + 391 |
| Nottingham Corp. ..... | ,, 14 | 2,969 | 3,209 | + 240 | 19½ | 65,328 | + 2,158 |
| Oldham Corporation ... | ,, 17 | 2,065 | 2,242 | + 177 | 21 | 46,231 | + 2,619 |
| Portsmouth Corp..... | ,, 16 | 2,566 | 3 195 | + 629 | 20 | 47 528 | + 1,111 |
| Preston Corporation .. | ,, 13 | 848 | 946 | + 38 | 20 | 17 856 | + 882 |
| Provincial ..... | ,, 16 | 2,342 | 2,894 | + 52 | 46 | 85,488 | + 5,164 |
| Reading Corporation .. | ,, 14 | 656 | 718 | + 62 | 19 | 13 647 | + 743 |
| Rochdale Corporation | ,, 16 | 1,474 | 1,639 | + 165 | 20 | 39,794 | + 978 |
| Rotherham Corp..... | ,, 20 | 775 | 1,024 | + 249 | 20 | 20,008 | + 5,210 |
| Salford Corporation ... | ,, 18 | 4,773 | 5,104 | + 341 | 20 | 105,752 | + 3 420 |
| Sheffield Corporation... | ,, 17 | 6,483 | 6,884 | + 401 | 21 | 151.774 | + 14 198 |
| Southampton Corp..... | ,, 13 | 1,339 | 1,488 | + 129 | 19 | 26,073 | + 882 |
| Southend-on-Sea Corp | ,, 13 | 1,360 | 1,697 | + 317 | 20 | 19,621 | + 2.375 |
| South Shields Corp..... | ,, 16 | 717 | 841 | + 124 | 20 | 14,713 | + 1.975 |
| Sunderland Corp. ..... | ,, 17 | 1,472 | 1,552 | + 100 | 20 | 29,675 | + 3.187 |
| Sunderland District .. | ,, 13 | 531 | 598 | + 67 | 41 | 22,336 | + 4,181 |
| Swindon Corporation'.. | ,, 13 | 184 | 209 | + 25 | 19 | 3,231 | + 233 |
| Trys.(M.E.T.)Omn. Co. | ,, 16 | ... | 7,803 | ... | 29 | 110,042 | ... |
| TynesideTrys.&Tmrds | ,, 13 | 516 | 556 | + 40 | 7 | 3,651 | + 1 295 |
| Wallasey Corporation | ,, 16 | 1,251 | 1,481 | + 230 | 20 | 25 583 | + 2,123 |
| Walsall Corporation ... | ,, 16 | 541 | 598 | + 57 | 33 | 20,265 | + 1,362 |
| Walthamstow U.D.C.... | ,, 16 | 684 | 759 | + 75 | 20 | 15,278 | — 561 |
| Warrington Corp ..... | ,, 7 | 450 | 461 | + 11 | 19 | 8,358 | + 321 |
| West Ham Corporation | ,, 14 | 2,473 | 2 560 | + 87 | 19 | 53,837 | + 1.359 |
| Wigan Corporation ..... | ,, 16 | 1,364 | 1,509 | + 145 | 19 | 28,895 | + 3,114 |
| Wolverhampton Corp | ,, 20 | 1,084 | 1,130 | + 46 | 21 | 22,511 | + 1,221 |
| Yorkshire (W. Riding) | ,, 17 | 1 283 | 1,391 | + 108 | 33 | 47,483 | + 5,171 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, August 22. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 77 — 80 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅛ — 4⅜ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | + 1/16 | 4⅛ — 4⅜ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 91 — 93 |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 95 — 97 |
| 100 | Do. 5% Deb. Stk. Red..... | ... | 97½ — 99½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum. Pref ..... | ... | 3/16 — 5/16 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13¾ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11⅛ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 1½ | 92½ — 94½ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 6¾ — 7⅜ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 97 —100 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5½ — 5¾ xd |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¾ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | + 1 | 126 —131 |
| 100 | Do. Pref. Ord. Stock ..... | + 1 | 111 —116 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 102½ —105½ |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | ... | 95½ — 97½ |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | + 7 | 85 — 88 |
| 100 | Do. 7% Non-Cum. Pref. ..... | + 7 | 46 — 49 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | + 1 | 9 — 10⅛ |
| 100 | Do. Deferred Ord. Stock ..... | + ½ | 4 — 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | ... | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | + 2 | 74 — 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | — 2 | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 6% 1st Mrt. Deb. | + ½ | 96⅛ — 98⅛ xd |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ — 6¾ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95½ — 98½ |
| 1 | Cape Electric Tramways, Ld., ..... | ... | 11/16 — 13/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5 5/16 — 5 5/8 xd |
| 100 | Do. 4% Debenture Stock Red, 1985 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95 — 97 |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | 8⅛ — 8 7/16 |
| 10 | Dublin United Trams. Co. (1898) Lim. Ord. ..... | — 3/16 | 10 1/16 — 10 5/16 |
| 10 | Do. do. 6% Pref. ..... | — ⅛ | 11¾ — 12¼ |
| 100 | Do. do. "A" Red. ..... | ... | 82 — 86 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | 79½ — 82½ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8½ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | 3/16 — 5/16 |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | 3/32 — 5/32 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | ... | 91½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3½ — 4¼ |
| 10 | Do. do. 6% Cum. Pref..... | ... | 6¼ — 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2½ — 2⅝ |
| 100 | Do. do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 3/16 — 5/32 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | 1 1/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¼ — 10¼ xd |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. ..... | ... | 1 3/16 — 1 5/16 |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | 1/16 — 3/16 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 96 — 98 |
| 100 | Do. Do. 5% Cum, Inc. Deb. Stk. Red. | ... | 88 — 90 xd |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 4¼ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 111 —114 |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 xd |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1/16 — 1/8 |
| 100 | Metropolitan Elec. Trms. Ltd..4½% Deb Stock, Red. ... | ... | 84 — 88 |
| 100 | Do. 5% Deb. Stock, Red. ... | — 1 | 90 — 93 |
| $100 | Mexico Tramways Co., Common Stock ..... | ... | 93 —101 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 92½ — 94½ |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — ⅛ | 92 — 94 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | + 1 | 92 — 94 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) ..... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd ..... | — 1/16 | 1 1/32 — 1 1/32 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6¼ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 6⅛ — 6⅜ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | + 1/8 | 6⅜ — 6⅝ |
| 5 | Do. do. 6% Cum. Pref. ..... | + 1/16 | 4 1/16 — 5 1/16 |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord..... | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 3/32 — 3/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | 3/32 — 3/32 xd |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim.. Ord. ..... | ... | 3/16 — 5/16 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% ... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.... | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | 3/16 — 5/16 |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | — ½ | 101 —103 |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | — ½ | 95 — 97 |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | 3/16 — 5/16 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | ... | 101 —103 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8½ — 9½ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 — 89 |
| 100 | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | 5/16 — ¾ |
| | Do. do. 4% Deb. Stk..... | ... | 63 — 68 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. .... | + ⅛ | 94 — 96 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 93 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 88½ — 89½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83¾ — 92½ |
| 5 | United Elec. Tramways of Monte Video, Ord..... | + 1/16 | 4½ — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4 1/16 — 5 1/16 |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | + 1 | 101 —103 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | 1/16 — 3/16 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 3¼ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### CITY OF CARDIFF.

The Cardiff Corporation invite tenders for the supply, delivery, and erection of the following plant at their Roath Power Station:

1. A 2,000 kw. Turbine Alternator with Surface-Condensing Plant and Auxiliaries.
2. A 700 kw. Rotary Converter.
3. Boiler House Plant in three Sections. Tenders will be considered for either Section, but not for a portion only of a Section.

Section (a). Water-Tube Boilers, Superheaters, Stokers, etc.
Section (b). Turbine-Driven Feed Pump and Heater.
Section (c). Fuel Economiser.

Specification and forms of tender may be obtained from Mr. Arthur Ellis, City Electrical Engineer and Manager, Central Offices, The Hayes, Cardiff, on payment of a deposit fee of one guinea for either of the three specifications, which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be had if desired at a charge of 5s. 0d. per copy, which will not be refunded.

Sealed tenders, endorsed "Electrical Extensions, Section —," to be delivered to the undersigned not later than noon on Friday, September 12, 1913.

J. L. WHEATLEY,
Town Clerk.

City Hall, Cardiff,
August, 1913.

### URBAN DISTRICT COUNCIL OF DARTFORD.

EXTENSION OF ELECTRICITY WORKS.

The Council hereby invite tenders for the supply, delivery, and erection of the following plant at the Electricity Works, Dartford, viz.:—

(*a*) Water-tube Boiler, Economiser, Fan, Steel Chimney, and Accessories.
(*b*) Inverted Rotaries, Transformers, Switchboard, and Cabling.

Firms tendering are at liberty to tender for either section, but not for part of a section.

Copies of the specification and form of tender may be obtained from the undersigned on depositing a cheque for two guineas, which sum will be returned on receipt of a *bonâ-fide* tender.

Further information can be obtained on application to Mr. J. D. Pember, the Electrical Engineer, at the Electricity Works, Dartford.

Tenders, sealed and endorsed "Tender for Extensions at Electricity Works." to be addressed to me and delivered by 12 o'clock noon, on Tuesday, September 16 next.

The Council do not bind themselves to accept the lowest or any tender.

W. KAY,
Clerk to the Council.

Council Offices, Dartford,
August 26, 1913.

### EAST INDIAN RAILWAY.

The East Indian Railway Company is prepared to receive tenders for the supply and delivery of:—

Steel Bull-Headed Rails and Fishplates,

as per specification, to be seen at the Company's Offices.

Tenders are to be sent to the undersigned, marked "Tender for Rails, etc.," not later than 11 o'clock a.m. on Wednesday, the 10th day of September, proximo.

The Company reserves to itself the right to divide the order, also to decline any tender without assigning a reason, and does not bind itself to accept the lowest or any tender.

For each specification a fee of £1 1s. is charged, which cannot, under any circumstances, be returned.

By order, C. W. YOUNG,
Secretary.

Nicholas Lane, London, E.C.,
August 28, 1913.

### LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply:—

Rails and Fishplates.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Thursday, September 4, 1913, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
August 28, 1913.

### CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF THREE-PHASE TRANSFORMERS.

Tenders are invited for the supply of Three 250 k.v.a. Three-phase Transformers.

Tender forms, specification, etc., can be obtained on application to the undersigned.

Such application must be accompanied by a deposit of 5s., which will be returned on receipt of a *bonâ-fide* tender.

Tenders to be sent to the undersigned, endorsed "Tenders for Transformers," and must be received by them not later than noon of Tuesday, September 16, 1913.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

McILWRAITH, McEACHARN AND CO. PPTY., LTD.,
Billiter Square Buildings, London, E.C.,
Agents for the Melbourne City Council.

### VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites alternative tenders for the supply and delivery f.o.b. port of shipment and c.i.f. Port of Melbourne, fully inclusive of Australian Customs duties, etc., of the following Rails and Fishplates:—

Contract No. 25,005.—Approximately 27,079 Tons of 80lb. Steel Rails.
Contract No. 25,005.—Approximately 2,215 Tons of Steel Fishplates for 80lb. Steel Rails.

Specifications, conditions of contract, and forms of tender may be obtained by *bonâ fide* tenderers at the offices of the Consulting Engineers, John Coates and Co., Limited, 25, Victoria Street, Westminster, London, S.W.

Tenders must be delivered to the Agent-General for Victoria, Melbourne Place, Strand, London, W.C., not later than 11 a.m. on Wednesday, October 8.

A preliminary deposit equal to ninepence for each and every ton of rails and fishplates must accompany each tender.

The Government of Victoria does not bind itself to accept the lowest or any tender.

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## POSITIONS VACANT.

### CAR DEPOT FOREMAN.

Wanted, for a Colonial Municipal Electric Tramway, a thoroughly competent working Car Depôt Foreman, to take charge of the repair and maintenance of rolling stock and track. One having experience with petrol motor vehicles preferred. For full particulars apply to "B. J.," care Davies and Co., Advertising Agents, Finch Lane, Cornhill.

### TORQUAY TRAMWAYS COMPANY, LTD.

PLATELAYER.

Applications are invited for the above position. Candidates must have experience in maintenance work, and must be able to, or willing to learn to, drive a car when required.

Applications, stating experience and wages required, together with copies of testimonials, to be forwarded to the undersigned.

H. Holliday,
Engineer and Manager.

Car Sheds, Torquay.

### TRAFFIC SUPERINTENDENT.

Traffic Superintendent. Competent man, unmarried, required to undertake duties of chief inspector for an Indian Tramway Company. Commencing salary £200 per annum, with quarters or an allowance in lieu thereof. Three years' agreement. Second-class passage paid. Address, with full particulars, to C. L., c/o Street's, 30, Cornhill, E.C.

## FOR SALE.

For Sale.—3,500 kw. Reciprocating Engine and Generator, complete with condenser and pump, now driving the L.C.C. tramway system. Can be seen running. Full particulars apply Geo. Cohen, Sons and Co., 600, Commercial Road, London, E.

## WANTED.

Copies of The Tramway and Railway World for September, 1906, October, 1907, and October, 1908. Apply to the Publishers, Amberley House, Norfolk Street, Strand, London, W.C.


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*British, Foreign and Colonial Representatives:—*

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 734, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

**Established in 1892 and Published by**
*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, AUGUST 30, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## THE RECEPTION OF THE MOTOR TRAFFIC REPORT.

It is not a matter for surprise to find that outside of traffic circles the reception accorded to the report of the Select Committee on power-driven vehicles in London has for the most part followed party lines. This adherence to party detracts from the value of the criticism bestowed upon the Committee's recommendations. In one or two cases the Moderate organs have eschewed partisanship and advocated the carrying-out of the recommendation made in 1905 by the Royal Commission on London traffic in favour of the creation of a Traffic Board for London. This recommendation also holds the field among the traffic experts of the Metropolis, if the views of one of them published in our columns last week may be taken as a criterion. The same view is held by the London General Omnibus management, who, however, are apparently willing to see the direct control of traffic placed in the hands of the new Traffic Branch of the Board of Trade which the Report of the Select Committee recommends should be set up for the purpose of advising Parliament in all Metropolitan traffic matters. Under the report of the Royal Commission the Traffic Board is to be composed of traffic experts, but the Board which the Select Committee desires to see brought into existence is seemingly only to have expert advice in matters connected with the design of mechanical public carriages. A vast amount of trouble would be averted if the Traffic Branch of the Board of Trade were to be constituted the sole authority instead of acting as a court of appeal for borough councils and transportation companies against the decrees of the County Councils of London, Middlesex, Surrey, and Kent. There is no guarantee that the action of the County Councils in traffic matters would be on uniform lines, and consequently not only delay but confusion would be created. The members of the Select Committee deserve praise for arriving at a unanimous report, but the circumstance that they are either past or present members of County Councils or provincial corporations appears to have led them to lose sight of the unique traffic conditions of London in a desire to remodel provincial conditions to suit the needs of the Metropolis. This shortcoming was avoided by the Royal Commission. Nobody ventures to assert that the police of the capital should be subject to the control of the several County Councils, instead of that of the Government, and in the same way the management of London traffic, both above and below ground, requires to be vested in a body responsible only to the Government of the day. The interest which is shown in the problem has been manifested in numerous articles in provincial journals, and at least one tramway chairman in the person of Ald. Fred Smith, of Liverpool, has made a contribution to the discussion. We are unable to find any grounds, however, upon which approval can be given to his suggestion that the new authority should be formed from among the chairmen of tramway committees and companies throughout Great Britain, adding the chairman of the Royal Automobile Club. If the latter is to be included the Automobile Association and Motor Union, which bodies have by far the largest membership, would rightly put forward a claim. London traffic authorities, however, will agree with Ald. Smith that they should be freed from fussy police interference, which, he states, can inconvenience great numbers of citizens and cause great loss by unwise dictation at a crush time of traffic. London has in addition to suffer from police opposition to tramway proposals submitted to Parliament.

## ALL NIGHT SERVICE AT MANCHESTER.

Of late years demands have arisen both at Glasgow and Manchester for an all night service of cars, but not until the present year have the management of the third largest tramway undertaking in the United Kingdom been able to obtain anything like a clear indication of the need for such a service. On more than one occasion invitations have been given to the public to afford the department the desired information, but hitherto the response had not been sufficient to warrant the introduction of anything approaching the hourly service which is to be instituted between half an hour after midnight and four o'clock on week mornings only before the end of next week. The information that has led the Tramway Committee to make their recommendation to the City Council with regard to the eight routes suggested by the manager has come from night workers themselves in the form of a memorial. The signatures numbered just over five thousand five hundred, and the would-be passengers have been met by Mr. McElroy in an exceedingly handsome manner. The report gives no information as to the probable financial results. This, indeed, is a matter upon which it is difficult to make a forecast until the facilities have become sufficiently known to bring the traffic up to its maximum. It will then probably be found that in addition to the patronage of night workers accessions will be gained to a small extent from others whom the service will induce to remain late in the city for purposes of pleasure or business. Probably also the newspaper and postal employees will very soon be asking for late cars on Sundays, for the majority of the former class are engaged at work on that night instead of on Saturday. If Manchester is without a Sunday morning delivery of letters, the postal workers will be found supporting a

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request for late Sunday cars. As at present framed, the service will probably be found to have been given on too liberal a scale, but adjustments can be made if required without detracting from the utility of the facilities. Apparently Mr. McElroy's time table provides more completely for night workers than is the case in London, if the size and population of the two cities are compared. Eight routes in Manchester are to be given an hourly service, while in London ten routes are provided with cars running every twenty-five minutes on the busiest lines, but a number of the Metropolitan services extend only to half-way points. One consideration in favour of the Manchester innovation is that ordinary fares are to be charged, while in the case of London workmen's fares are charged, namely, a penny for a single journey and twopence return. Thus the London all night traffic is included in the general workmen's services, upon which a loss of some £70,000 per annum is incurred. The Manchester Committee's resolve to charge full fares will render their experiment of real interest to other large undertakings, and another interesting feature of it is that the department's motor omnibuses are to be utilised when the more important repairs and reconstructions of tramway track have to be undertaken.

## EMPLOYEES' DEMANDS.

Partial Strike in Dublin.

A number of the Dublin tramway employees went on strike on Tuesday, leaving several cars in the streets. The trouble came about with dramatic suddenness, and the local authorities, as a matter of precaution, had secured military aid in reserve to reinforce the police. After a short stoppage, a temporary service was established by the officials of the company. A number of men who left their cars on the streets were given into custody by the manager of the Tramway Company.

The Tramway Company issued the following statement in regard to the strike:—"Shortly before ten o'clock this morning some of the company's cars were deserted by the men in charge of them, who left them standing in the streets. These cars were promptly cleared off, and traffic was continued with a slightly reduced service. The company regrets the inconvenience to the public, which will be of short duration. The cars, however, will not be run after dark this evening."

Seven motormen and conductors who were arrested for abandoning their cars and so obstructing the line were subsequently charged at the police court and remanded on bail. It would appear that the employees were themselves ignorant of the intended strike until they had taken up their duties. An intimidatory method was used by the representatives of the would-be labour dictator of Dublin to call out the men. His emissaries met the cars, and held out red hand badges. The strike leaders are trying to foment strife, but from the reports of their speeches it is impossible to gain any idea of what the demands of the men really are. The strike leader, Larkin, for example, criticises all with a glib volubility, but says never a word as to what grievances the men may have. There have been meetings of the men, and though statements have been issued as to large majorities having voted for an immediate strike, these reports are invariably subsequently contradicted. Nevertheless the authorities have prepared for emergencies, and extra constabulary have been ordered to Dublin. Mr. Larkin, the would-be labour leader, is alleged to have urged the strikers to arm themselves and hold a meeting in defiance of the authorities. For this he and four others were on Thursday charged with seditious libel and seditious conspiracy, and they were committed for trial. Bail was allowed on the condition that meanwhile no inflammatory speeches will be delivered and that no attempt is made to hold an illegal meeting. A fair service of cars is being maintained, the strikers not numbering more than 150 out of 800 employees. Visitors have written to the newspapers expressing admiration for "the remarkable discipline displayed by the tramway officials when the attempt was made to create confusion by the strikers leaving the cars." No sooner did a conductor arrive in the office and the bag in which he carried his tickets and money was handed over to the officials than another driver and conductor set off for the derelict car, and with extraordinary rapidity the streets were cleared.

Manchester.—The Corporation tramway employees are asking for increased wages. They apply for an extra shilling a week all round and an annual seven days' holiday. The case for the men has been laid before the Tramways Committee by the general secretary of the Tramway and Vehicle Workers' Union, and the committee has promised to give due and careful consideration to the demands of the men.

Newcastle.—There is an agitation amongst the employees on the Newcastle Corporation tramways for a minimum wage of 24s. for the lowest paid employees of 21 years of age, rising to 28s. at 25 years. The men have been holding meetings to place their case before the public. A deputation waited upon the Tramways Committee to urge the claims of the men, and it was subsequently announced that various concessions would be recommended. Councillor J. Smith, at one of the meetings of the men, estimated that the claims of motormen and conductors would involve an extra cost of only £1,537 per annum. The increase wanted was 1s., making the minimum wage for motormen 32s., rising after seven years' service to 33s. The main reason for pressing the question was the cost of living. Since 1905 the increases in wages had only amounted to 2s., or 1s. 4d. less than the actual advance in the cost of living. The men in the past had proved their loyalty, and that loyalty justified their claim for the advance in wages. But for it the system could certainly not have been so profitable. Out of the surplus of £38,000 last year, £21,000 had been paid to reserve, and £13,000 had been passed over to the relief of the rates. If the full claim of the workmen had been sanctioned at the last sub-committee meeting, it would not have cost £3,000.

Ashton.—No steps are being taken to open up negotiations for a settlement of the dispute between the men engaged on the tramcars in the districts of Ashton, Stalybridge, Dukinfield, Mossley, and Hyde, and their employers, the Oldham, Ashton, and Hyde Electric Tramways Company, the Ashton Corporation, and the Stalybridge, Dukinfield, Hyde, and Mossley Tramways Board, and, as a result, the strike notices which have been issued will terminate at midnight to-day (Saturday). Between 300 and 400 men are concerned, and a strike will necessarily affect the running of the through Manchester and Stockport Corporation cars.

Rochdale.—The tramway employees are demanding various concessions, and a conference has been arranged between the representatives of the men and the Tramways Committee. Already the committee have expressed willingness to make various concessions. The principal points of the men's programme include a ten-hour day; six days a week; and increased rates of pay for various grades.

Glasgow.—The Corporation Tramways Committee have approved of recommendations of a special sub-committee that as from June 1 last the wages of motormen and conductors who have been in the service over six years be raised to 34s. per week, and that from June 1 next motormen and conductors with over seven years' service be paid 35s. per week. The wages at present range from 25s. per week on joining the service to 33s. in the sixth year and thereafter. The increases involve additional expenditure of £9,500 per annum.

## METROPOLITAN TRAMWAYS TRACK BRAKES

Increased Power Instituted as the Sequel to a Mishap.

Arising out of the running away of a tramcar down the hill to the Wood Green entrance of the Alexandra Palace, the driver of a car belonging to the Metropolitan Electric Tramways Company was summoned at the local Bench for driving negligently, thereby colliding with a pony and barrow, the driver of which was injured. The summons, however, was dismissed.

The evidence of Chief Inspector Bradley, of the Public Carriage Department, Scotland Yard, was to the effect that a car travelling at 18 miles an hour on a perfectly level road could be stopped in 36 feet. A steep incline would cause the car to go on further. Witness would not say that accidents could not happen, and admitted "intermittent failure." It must, however, be accepted with great caution that the brake failed without the cause being discovered. If a cause could not be found they had to rely on the word of the driver.

For the Tramway Company it was urged that the route had been open for six years and although it was steeper than Highgate Hill there had never been an accident there before. The cars were duly fitted with proper brakes, but on this occasion the greasy state of the road caused the driver to lose control. If the Act meant anything at all it certainly meant that the offence must be wilful.

The theory put forward by Mr. Adamson, a brake specialist of the Tramway Company, was that, finding his car going beyond the ordinary speed, the driver put on his slipper-brake and handbrake so hard that the wheels skidded, and in these circumstances the electric brake would not act. All the drivers of cars down this hill were specially trained in carrying out the Board of Trade regulations. Any hill with a gradient of 1 in 9 to 14 must be regarded as dangerous, and should be treated with caution. Witness examined the brake the next day and found it in order. He had been convinced that "intermittent failure" of brakes was possible—there had been a case of failure with an inspector standing by the driver, though subsequent examination failed to reveal the fault. This was a failure of the electric brake. Since the accident in the present case the brake-power of the track brakes on these cars had been increased. Witness would not admit in cross-examination that the driver did not act with proper judgment from the top of the hill.

Motorman Cole, the defendant, said he did not suggest that any of the brakes were not in order at the time of the accident; he thought the failure was due to the greasy state of the rails. A sharp shower an hour before had brought up all the grease which there had been no heavy rain to wash away. There was no ordinary traffic over this road, which on other roads brought grit on to the lines and made them less slippery.

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## HOURLY NIGHT CARS FOR MANCHESTER.

MOTOR OMNIBUSES TO BE UTILISED DURING EXTENSIVE TRACK REPAIRING.

The Manchester Tramways Committee on August 26 considered a report presented by Mr. J. M. McElroy, the tramways manager, upon the petition recently presented to the committee asking for the institution of a service of all-night tramcars or motor omnibuses. Mr. McElroy stated that until the receipt of the petition recently presented there had been no clear evidence as to what the demand really amounted to. An analysis of the addresses of those who signed the petition had been made, and the general manager had had plans prepared showing the location of each petitioner (a) for the week-night service and (b) for the early service on Sunday mornings. A glance at the plan indicating the demand for the week-night service showed that many of the petitioners live in districts served by the Salford tramways, and a number live in districts very remote from the centre of the city—viz., in Oldham, Ashton-under-Lyne, Stockport, Northenden, Sale, Timperley, Altrincham, Urmston, and Flixton. The greatest demand appears to be in the Cheetham Hill, Harpurhey, Moston, Newton Heath, Moss Side, Rusholme, Longsight, and Levenshulme districts, and to a lesser extent in the Gorton, Bradford, and Openshaw districts.

Mr. McElroy's opinion was that an hourly service of cars ought reasonably to meet the demand at the present time. From the point of view of the tramways department there were objections to the running of an all-night service, the principal one being that it made the efficient maintenance of the track and overhead equipment more difficult. But the department had always endeavoured to meet the demands of the public in every reasonable way, and in the present instance, if the committee determined to fall in with the views of the petitioners, the department would endeavour to carry out the minor repairs during the intervals between the running of the cars, and when more important repairs or reconstructions were necessary the sevices would have to be run by means of motor omnibuses.

The general manager added that there was only one instance in the United Kingdom of the running of all-night services—viz., in London, but in the United States it was quite a common practice to run such services. In the City of New York there was a ten minutes' service running all night. He recommended that the services be limited to week-nights only, the demand for the early morning service on Sundays being so very small. From the department's point of view this was fortunate, because it left a considerable interval for the carrying out of repair work between the running of the last cars on Saturday evening and the first cars on Sunday morning.

The committee adopted the report, which will be presented to the City Council on September 3. If agreed to then the recommendation will be put into operation forthwith.

## MISCELLANEOUS NEWS AND NOTES.

**Perth Tramways.**—The Perth tramways have now been taken over by the Australian Railway Commissioner, and a schedule of working conditions for the employees has been drawn up.

**Belfast Tramways.**—The Glengormely branch of the Belfast tramway system has proved profitable, in spite of the doubts expressed when the line was purchased. In seven months the profits have been £1,017.

**Aberdeen Car Shed Accommodation.**—A special committee of the Tramways Committee are considering a scheme put forward by the manager to erect a car shed capable of holding 24 cars, at an estimated cost of £8,600.

**Thermit, Limited.**—By a printer's error in our issue of August 14 last, the address of Thermit, Limited, was given as 72, Martin's Lane, Cannon Street, E.C. The address of the firm remains as it has hitherto been, viz., 27, Martin's Lane.

**London Roads.**—Mr. J. Burns, the President of the Local Government Board, will preside over a forthcoming conference of local authorities and others concerned in the improvement of arterial road communication in Greater London.

**Free Rides.**—On the occasion of the opening of a huge store at Calgary, the entire tramway system was hired so that everybody could travel to and from the new emporium without charge. The idea proved a capital advertisement for the new concern.

**First-Class Cars to the Theatre.**—Patrons of the first-class cars in Liverpool are appealing for more cars so that they can get to and from the theatres. Now most of the first-class cars cease running at eight at night, and it is asked that the hour should be extended to ten p.m.

**Tramcar Letter Boxes.**—An interesting tramcar letter box experiment is to be made in Wales. After September 1 tramcars leaving Tynewydd and Mardy will have boxes for the receipt of letters. The experiment, which is by no means an innovation elsewhere, is to be tried for six months.

**Machinery for Plymouth Workshops.**—The Tramways Committee have adopted a recommendation made by Mr. C. R. Everson, tramways manager, for the purchase of machinery for the equipment of the workshops belonging to the tramway undertaking at an estimated cost of £1,018. Mr. Everson stated that the adoption of the proposal would result in an estimated saving of £180 per annum.

**Largest Tramway Depot.**—The Lichtenberg car shed of the Greater Berlin Tramway Company which was recently opened is declared to be the largest tramway depôt in existence. There is now accommodation for 500 cars. It is proposed to accommodate the two thousand employees in a garden city formed around the depôt.

**Plymouth Tramways Company.**—At the meeting of the Plymouth Tramways Committee a letter was received from the managing director of the Plymouth, Stonehouse, and Devonport Tramways Company containing a proposal for the extension of the company's tenure of the tramways in Union Street, and the matter was referred to the Finance Sub-Committee for consideration.

**The Tramcar Habit.**—Sir Ian Hamilton, in the course of a report on Canadian military affairs, mentions that the city corps require training in pedestrianism for the reason that they suffer from the prevailing Canadian habits of preferring any other mode of locomotion to making appeal to their legs. Their chief function, he declares, seems very often to consist in standing in the street waiting for a tramcar.

**Improved Methods at Newcastle.**—The City Tramways Department are renewing portions of the permanent way with Sandberg rails weighing 110 lbs. per yard. To prevent water from finding a lodgment under the rails a packing is being utilised of steel slag broken to 1¼ in. gauge and combined with a pitch mixture. A large number of central standards are being replaced with span wire overhead equipment.

**An Addition to Newcastle Tramways.**—On August 19 a direct service was opened from Heaton terminus to Lemington, a distance of over six miles. Previously the Heaton-Scotswood section finished at the Scotswood Suspension Bridge, and passengers to Bell's Close and Lemington had to change cars. The fare for the complete trip to Heaton is 4½d. The section from Lemington to Sandy Banks, near Newburn, will be brought into use when the cars have been supplied with mechanical slipper brakes as advised by Colonel von Donop.

**A Tramway Transfer.**—The tramway from Bradford to Bingley is to be leased, as from September 15, by Bingley Urban Council to Bradford Corporation. The lease will terminate May 17, 1932, and Bradford Corporation will pay Bingley Council annually one-twentieth of the capital expenditure and the interest on the capital, and also £150 per annum, which is payable by Bingley Council to Shipley Council in respect of the junction of the tramway with the Shipley Council's tramways, and the Corporation will take current for working the line from Bingley Council.

**First-Class Fares.**—Glasgow is discussing various tramway points, including one regarding the possibility of first-class car fares. This idea has been tried in Liverpool and with good results, but when the matter was once suggested to the Glasgow Tramways Committee it was declared that the people would protest against such an innovation, for first-class fares would bring about undesirable class distinctions. Nothing, however, will be done until Mr. Dalrymple, the tramways manager, returns from America, whither he has gone to study the latest developments in tramways.

**Luggage Trailers.**—There is a suggestion that the Birmingham Corporation should follow the example of Dresden and put trailers on some of the tramcars for the purpose of carrying luggage. The idea has already been considered, but the matter will require much investigation before it can be put in practice. As the chairman of the Birmingham Tramways Committee explains, any such scheme would have to be carefully prepared and organised. The collection and delivering of parcels was a big undertaking, and would need a special department. He fears, however, that luggage trailers would cause delay.

**A South Lancashire Extension.**—The new tramway at Little Hulton has not yet been inaugurated owing to the refusal of the Board of Trade to sanction the running of cars for the present, an objection having been lodged by the London and North Western Railway Company on the grounds that their two railway bridges across which the tramway runs are not sufficiently strong. The new track, which will bring a very desirable convenience to the residents of the district, has been laid by the South Lancashire Tramways Company, and, commencing at the Walkden Monument, traverses Manchester Road, Little Hulton, Clegg's Lane, and Buckley Lane to the junction of Albert Road and Longcauseway, Farnworth.

**Mr. Fussey Fails to Discriminate.**—The Chairman, Deputy-Chairman, Tramways Manager, and Tramways Electrical Engineer of Hull Corporation have been appointed delegates to the conference of the Municipal Tramways Association, to be held at Sheffield on September 24-26. A councillor bearing the appropriate name of Fussey objected to the resolution, on the ground that "it was time some steps were taken to prevent these deputations for pleasure." Mr. Hargreaves, the deputy-chairman, in an endeavour to clarify the intelligence of his colleague, explained that they were simply following a practice that had stood for ten years, and he had no hesitation in saying that the Council had received good value for the money they had expended in sending deputations to that particular conference. At these meetings they had practically every municipality and county represented, and all the best towns were represented by chairmen, members of committees, and various officials. The Hull Council were dealing with an undertaking in which half a million of money was invested, and they must have the best knowledge available. It is pleasant to record that only two members of the Council supported Mr. Fussey, and that Hull will as usual be well represented at the conference.

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**Tramwaymen and the Territorial Force.**—Manchester has achieved a measure of fame in the way of its large proportion of tramwaymen who serve in the Territorial Force. A hundred men have just concluded their annual training, and never before have so many been away to prepare themselves for the defence of their country. A word of praise is not only due to the men but also to the patriotic spirit of the committee and the general manager who gave the men the facilities for training. A full fortnight's leave is given to Territorials, with full pay, this being in addition to the regulation week's holiday with pay which the committee gives to all the men.

**Tests of Wood for Paving Blocks and Sleepers.**—In connection with the timber research work of the Cambridge School of Forestry inaugurated with the aid of the Development Commission, the city engineer of Norwich has offered to test the value of different woods and preservative processes in street paving, while the Great Northern Railway Company have offered to conduct experiments with wood for sleepers. In notifying a scheme for carrying out these objects the school management states that the occasion will afford an opportunity for obtaining information as to the relative mechanical and physical durability of British timbers suitable for outside work. They are endeavouring to obtain promises from estate owners, agents or foresters to furnish supplies of all the most important species of timber which are or can be grown in this country.

**Fares in Leeds.**—A comprehensive scheme for revised fares and stages is promised by the Leeds Tramways Committee. The extension of halfpenny fares to additional routes has occasioned some comment by individuals who expect to take halfpenny fares throughout a section at the same cost as for a ticket for the complete journey. Mr. A. Daggett, the traffic superintendent, has explained that the principle the Tramways Committee worked on was to give half a mile for a halfpenny, and two miles for a penny. From Boar Lane to Lawnswood cost 4½d. in halfpenny fares, but only 2½d. by taking a through ticket. At first the tickets from Boar Lane to Lawnswood were 3d., but since the introduction of two miles for a penny the fare was now only 2½d. Mr. Daggett admitted that the sore point in the new arrangement was the alteration in the penny fares on the Roundhay route, whereby persons now travelling between the Gipton and Byron Street will have to pay 1½d. instead of a penny, as formerly. In explanation of this change, Mr. Daggett states it had been made to facilitate the work of fitting in halfpenny fares.

**Messrs. Kearsley and Company's Annual Convention.**—Something of a new departure was made by Messrs. Robert Kearsley and Company on August 13, 14, and 15, when they held what is described as their first annual convention at Ripon. Gatherings or conventions of the heads of departments and others prominently connected with large firms or companies are fairly well known in America, and their value is well recognised. They are now being more appreciated by British firms also, and combining as they do business with pleasure, they are not only the means of creating friendships among the representatives, but give added strength and unity to a concern. One of the ideals of Messrs. Kearsley and Company is what may be described as the development of the "team" spirit, and undoubtedly the camaraderie which results from such a policy, and from the happy relations which exist between the firm and their staff as a whole has contributed in no small degree to the success which the firm has achieved of late years. On the occasion of this convention two interesting and profitable days were spent at the works in discussing various matters in connection with the trade. The firm also entertained those attending the convention to a dinner, followed by a smoking concert, and on the last day the party started off for a long motor tour through Wensleydale.

**Wireless Electric System of Train Control.**—The London and South-Western Railway Company have for three months past been experimenting with the Prentice "wireless" system of train control on a mile and a quarter of track on the London side of Hampton Court Station. On August 26, by invitation of Mr. G. A. Phillips, of 4, Bishopsgate, E.C., the South-Western management afforded the representatives of the technical Press an opportunity of seeing the system in operation. The party were accompanied in a special train from Waterloo by Mr. Phillips, Mr. J. W. Jacomb Hood, chief resident engineer, L. and S.W.R.; Mr. A. H. Johnson, telegraph and signal superintendent, L. and S.W.R.; and Mr. Buckmaster, chief clerk to Mr. Walker, the general manager; together with Mr. Drayton, chief railway commissioner to the Canadian Government. The installation is similar to the system already tested on the Canadian Pacific Railway, and its introduction on the Hampton Court line has proved so successful that about a month ago Mr. Herbert A. Walker, the General Manager of the London and South-Western Railway, invited the chief officers of other railway companies to attend a demonstration of its working. These experts, we learn, were favourably impressed by what they witnessed. On August 26 two demonstrations were given. On each occasion the train and a separate engine were facing each other on the same line, the visitors occupying the cab of the locomotive drawing the train. The control of the engine was perfect, the brake being applied by the wireless waves and the engine brought to a standstill entirely independent of the driver. By the pressing of a button the driver is enabled to release the brakes after the automatic application of the same, and to proceed if necessary up to the signal. There is also a "buzzer" to attract the driver's attention. Under the engine the apparatus is just as inconspicuous, the feature here being the "harp." The electricity is supplied to a transformer at the side of the track, from which a high-frequency current is transmitted along a wave wire laid in the centre of the rails and encased in wood.

**The Mistake of the Ardent Motorist.**—To the enthusiastic motorist, the popular tramway car is naturally enough anathema. He does not require to use the cars, and neither the cars themselves nor the rails on which they run add to the pleasures of motoring. He seldom stops to reflect that there are millions of people who find the tramcar as great a boon as he finds the motor car. It is the factor of numbers that makes the motorist's suggestion that all tramways should be superseded by motor omnibuses so impracticable. The tramcar is the vehicle of the million, and not even a rolling platform of motor omnibuses would adequately deal with the traffic carried by tramcars in the rush hours in any large town. But the motor enthusiast means no harm, and we owe much to his concentration and devotion to his subject. The attitude of mind sometimes attained by this concentration was amusingly illustrated by the description of twenty-four motor omnibuses which on a recent occasion careered through Windsor Great Park, as "a lovely sight." There had been no rain for weeks, and the "sight" after passage of those omnibuses can be imagined. Another ardent motorist and a member of the Road Board, Sir John Macdonald, also gave evidence of the results of undue concentration on the subject, when speaking at the recent Motor Transport Conference. "I do not say," he remarked, "that *all* tramway rails will be taken up"—even the ardent motorist has his limits of exaggeration—"but very few rails will be laid down in the future. It has been predicted that the last motor omnibus will be found in the British Museum. It is much more likely that this will happen to one of these enormous menagerie cars, if it could be got through the doors of any museum." Here there is again a want of balance. The "menagerie car" is built to carry the masses. It is not, we grant, a "lovely sight"; but it does the work for which it is designed, and it does it well, and there is nothing that can take its place. The mistake of the ardent motorist is that he fails to understand that he must produce something with which to replace the tramway car before he consigns it to the limbo of forgotten things.

## CONTRACTS AND ORDERS.

**Peterborough Council** have allotted a contract to Crompton and Co., Chelmsford, for a new switchboard, at £576.

**Belfast Council** have accepted the offer of Bertram Thomas for the supply of a 3,500 ampere traction switchboard panel.

**Eccles Council** have awarded a contract to the Triumph Stoker, Limited, to equip four boilers with their mechanical stoker.

**Keighley Council** have accepted the tender of Ed. Bennis and Co. for the supply and erection of a Bennis stoker to a Lancashire boiler, at £130.

**Glasgow Council** have accepted the tenders of the Lorain Steel Company and Hadfield's Steel Foundry Company for the supply of special track work.

**A. Graham and Sons,** of Longroyd Bridge, have received a contract for the widening of Long Wall, Huddersfield, in connection with the West Vale tramway extension.

**Messrs. J. W. Courtenay, Ltd.,** of London, have been awarded the contract for the advertising on the cars of the Aberdeen Corporation tramways for the ensuing five years. It was stated that the tender of Messrs. Courtenay, Limited, was the highest of the offers received.

**John Taylor,** of 7, Strand Street, Liverpool, has received orders from Manchester Corporation for 120 tubular sanding devices, and from the Brush Electrical Engineering Company for 100 tubular sanding devices for use on the new cars they are now building for Sheffield Corporation.

**The Railway Track Supply Company of Great Britain,** 81, Gracechurch Street, London, E.C., have recently received an order for 20,000 "Vaughan" rail anchors for the South Manchurian Railways. They have a large number of orders on hand all over the world for these rail anchors, for which they hold the sole licence to manufacture and sell in Great Britain and the British Colonies.

**Warner Trucks.**—The M. and G. Truck and Engineering Company, British licensees for the Warner non-parallel axle truck, have received three repeat orders from the Colombo tramways for vehicles of this class. The first car of the kind, which was sent out in 1910, and was illustrated in our issue of January, 1913, has proved completely satisfactory, and is noted for smooth running and reliability.

## PERSONAL.

**Mr. L. J. Kettle,** deputy city electrical engineer to Dublin Corporation, has had his salary raised from £400 to £600 by increments of £50 per annum.

**Mr. G. F. Upcott,** of Leyton, has been appointed manager of the Walthamstow Council tramways at a commencing salary of £130, rising by annual increments of £10 to £160 per annum.

**Messrs. P. J. McIntosh and W. G. Ross** have been added to the directorate of the Montreal Tramways Company, thus increasing the board from seven to nine members. Mr. McIntosh is in touch with the financiers in New York and Boston, whose association has been so useful to the board. He is also confidential assistant to Mr. W. Rockefeller. In Mr. Ross, who was managing director for many years, the board have the benefit of the advice of one who thoroughly understands the requirements of the company and its patrons.

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**Mr. J. R. Mead,** the new borough surveyor of Ipswich, was formerly with the borough engineer of Burton-on-Trent, where he had considerable experience in tramway renewals and extensions. This experience served him in good stead from 1905 to 1911 while holding the position of general engineering assistant to the borough engineer of Birkenhead. From 1911 to the present time he has been deputy engineer of St. Helens.

**Bailie. W. B. Smith** and **Mr. W. W. Lackie,** convener of the Glasgow Electricity Department and chief engineer of the Electricity Department respectively, arrived at Montreal on August 24 and proceeded to Toronto to view the generating plant at Niagara Falls. Afterwards they intended to examine several large power stations at Chicago and thereafter proceed to Pittsburg where Bailie Smith will attend a conference on smoke abatement. After a visit to the works of the G.E.C. and Westinghouse Companies they will travel to New York to inspect power stations, arriving at Glasgow towards the end of the first week in October.

**Alderman Fred Smith,** chairman of the Liverpool Tramways Committee, replying to correspondence evoked by his letter to the newspapers on the report of the Select Committee of the House of Commons on London motor traffic, says :—" In the days of the horse tramcar in Liverpool one person was killed by that system for each 6,000,000 carried, whilst with the quicker electric service under municipal control for the ten years ending December 31, 1912, only one person was killed for each 22,000,000 carried. Further, may I add the interesting fact that as the committee gained experience the cost of accidents was practically reduced in 1912 to one-fourth of its cost in 1908."

## FINANCIAL REPORTS AND MEETINGS.

**Silverton Tramway.**—The directors have declared an interim dividend of 1s. per share, together with a bonus of 1s. per share.

**Para Electric Railways and Lighting Company.**—An interim dividend at the rate of 10 per cent. per annum has been declared on the ordinary shares for the half-year.

**Ayr Tramways.**—The annual financial statement shows the revenue to have been £16,295 and the expenditure £9,042, leaving £7,253 gross profit. The net profit was £3,316.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended August 22 amounted to £55,936. Upon such of the lines as were working both last year and this year the receipts show an increase of £3,174 upon the week.

**A Good Outlook at Swansea.**—The receipts of the Swansea Tramways Company for the last 33 weeks show a total increase of £4,018, and Mr. D. James, the tramways manager, explains that it was due partly to the fine weather, but more particularly to the heavy increase in mileage run and the improved services on various sections.

**The Bristol Undertaking.**—At the next meeting of the Bristol Corporation a report will be brought forward by a special committee in favour of securing Parliamentary powers for the purchase of the tramways. The option of purchase matures in 1915, and the Corporation desires to secure the sanction of Parliament for exercising the option should such then be deemed desirable.

**Dublin and Blessington Steam Tramways.**—Mr. R. S. Guiness presided at the ordinary general meeting. The secretary's report showed the gross receipts to amount to £3,869 and the expenses £4,217. This showed a loss of £348 for the six months as against a profit of £280 for the corresponding period of 1912. The chairman mentioned that there had been a noteworthy increase in passenger traffic, and explained that though the half-year showed a loss yet it was good policy to spend money in developing the undertaking. It was decided to pay a dividend at the rate of 5 per cent. per annum for the half-year. Appreciation was expressed of the energies of Mr. J. P. Tierney, the general manager, to improve the company's affairs.

**Halifax Tramways.**—The annual report of the Halifax Tramways Department states that the amount expended on capital account at March 31 last was £412,762, and the mortgage debt on the undertaking stood at £209,480. The net profit was £12,680, or 1.41d. per car mile, compared with £18,020, or 2.06d. per car mile, in the previous year, and £11,514, or 1.45d. per car mile in 1911. The total revenue was £105,073, or 11.82d. per car mile, and the working expenses £69,661, or 7.77d. per car mile, compared respectively with £101,893, or 11.63d. per car mile, and £62,890 or 7.18d. per car mile in the previous year. The route mileage was now equal to 54 miles 1,549 yards of single track, and the average amount of units of electrical energy used per car mile run was 1.81, as against 1.69 the year before. The gross profit is equal to 8.04 per cent. on the capital expenditure, and the net profit equal to 3 per cent.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended August 23 amounted to £259,958, or £19,244 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £95 17s. 1d. per track mile, an increase of £5 7s. 3d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

August 29, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, August 29. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 71 5 0 .. | 68 10 0 .. | 78 17 6 |
| ,, ,, (three months) .. .. | 71 3 9 .. | 68 10 0 .. | 79 7 6 |
| Electrolytic Copper—bars or ingots .. | 74 10 0 .. | 72 10 0 .. | 82 0 0 |
| Aluminium—bars or ingots .. .. .. | 86 10 0 .. | 86 10 0 .. | 77 0 0 |

## COAL MARKET.

August 29, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, August 29. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 .. | 25 6 .. | 22 6 .. | 22 9 |
| Best Seconds .. .. .. | 24 6 .. | 24 9 .. | 21 6 .. | 21 6 |
| Ordinary Drys .. .. | 22 0 .. | 21 0 .. | 20 6 .. | 19 6 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 6 .. | 19 0 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 0 .. | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 .. | 21 0 .. | 17 0 .. | 18 9 |
| Best Seconds .. .. | 20 0 .. | 20 3 .. | 16 0 .. | 17 6 |
| Ordinary Drys .. .. | 17 6 .. | 16 6 .. | 14 9 .. | 15 6 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 15 0 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 .. | 15 6 .. | 13 9 .. | 11 3 |
| Best Seconds .. .. | 13 9 .. | 13 6 .. | 12 3 .. | 10 0 |
| Smalls .. .. .. | 9 3 .. | 9 6 .. | 9 3 .. | 5 6 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Aug. 26 | £48,263 | £50,368 | 34 | £1,884,512 | +£166,451 |
| Auckland (28 days) | Aug. 1 | 18,353 | 18,960 | 4 | 22,067 | + 269 |
| Ballarat and Bendigo | July 13 | 826 | 776 | 15 | 13,559 | — 163 |
| Bombay | Aug. 1 | 2,765 | 3,033 | 31 | 96,134 | + 4,218 |
| Brazilian St. Rly. Mlrs. | July | 41,756 | 49,056 | 52 | 545,185 | + 24,923 |
| Brazilian Traction | Aug. 28 | 84,956 | 94,134 | 38 | 2,918,038 | + 438,166 |
| Brisbane | July | 23,060 | 26,205 | 30 | 177,208 | + 46,494 |
| British Columbia $ | June | 498,306 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | June | 5,985 | 6,249 | 26 | 89,560 | + 1,361 |
| Buenos Aires Lacrose | July | 42,052 | 45,324 | 4 | 45,324 | + 3,272 |
| Calcutta Rs. | Aug. 23 | 59,200 | 63,772 | 34 | 21,59,704 | + 104,558 |
| Cape Town | June | 11,076 | 11,560 | 26 | 75,463 | + 4,640 |
| Carthagena & Herrerias | July | 3,350 | 3,794 | 30 | 21,125 | + 6,842 |
| East India | June | 1,788 | 1,892 | 47 | 20,281 | + 2,750 |
| Kalgoorlie | July | 2,993 | 2,796 | 30 | 20,022 | + 1,628 |
| La Plata | July | 3,592 | 4,770 | 30 | 36,342 | + 7,999 |
| Lima | July | 32,259 | 34,410 | 30 | 232,637 | + 10,361 |
| Lisbon Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Aug. 15 | 24,838 | 27,084 | 32 | 402,121 | + 80,254 |
| Melbourne | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico $ | July | 570,619 | 610,602 | 30 | 3,876,143 | + 84,102 |
| Montevideo | July | 25,435 | 29,189 | 39 | 287,602 | + 23,745 |
| Para | Aug. 21 | 4,209 | 3,607 | 38 | 153,421 | + 1,752 |
| Perth (W.A.) | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth | June | 2,974 | 3,268 | 26 | 21,871 | + 6,632 |
| Shanghai $ | Aug. 20 | 19,486 | 24,200 | 33 | 711,252 | + 73,706 |
| Singapore $ | Aug. 23 | 9,535 | 12,932 | 34 | 401,281 | + 48,842 |
| Toronto $ | June | 696,980 | 815,206 | 26 | 4,655,484 | + 642,767 |
| Winnipeg $ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London | Aug. 23 | £4,306 | £3,657 | 34 | £166,492 | +£11,600 |
| City and South London | ,, 24 | 2,975 | 2,431 | 34 | 95,499 | — 9,000 |
| Liverpool Overhead | ,, 24 | 1,693 | 1,869 | 34 | 58,845 | + 4,664 |
| London Electric | ,, 23 | 11,500 | 10,795 | 34 | 467,879 | + 4,790 |
| Mersey | ,, 23 | 1,928 | 2,015 | 34 | 75,711 | + 4,953 |
| Metropolitan | ,, 24 | 15,922 | 15,526 | 34 | 568,486 | + 3,048 |
| Metropolitan District | ,, 23 | 10,931 | 11,225 | 34 | 442,556 | + 18,168 |

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**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| Name. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Aug. 30 | £1,668 | £1,861 | + £193 | 13 | £20,589 | + £1,332 |
| Ayr Corporation ..... | ,, 23 | 414 | 588 | + 174 | 14 | 7,342 | + 683 |
| Bath Electric ..... | ,, 20 | 994 | 1,448 | + 454 | 34 | 32,636 | + 2,257 |
| Birkenhead Corp. ..... | ,, 24 | 1,142 | 1,274 | + 132 | 21 | 27,340 | + 2,842 |
| Birmingham Corp. ..... | ,, 23 | 10,619 | 11,261 | + 642 | 21 | 238,554 | + 16,936 |
| Blackburn Corporation | ,, 20 | 1,149 | 1,318 | + 169 | 21 | 28,107 | + 2,419 |
| Blackpool & Fleetwood | ,, 23 | 1,914 | 2,326 | + 412 | 8 | 15,735 | + 2,100 |
| Blackpool Corporation | ,, 21 | 3,982 | 4,962 | + 980 | 20 | 47,213 | + 6,013 |
| Bolton Corporation ..... | ,, 24 | 2,533 | 2,725 | + 192 | 21 | 57,596 | + 2,766 |
| Bournemouth Corp..... | ,, 27 | 2,590 | 3,031 | + 441 | 21 | 48,501 | + 5,604 |
| Bradford Corporation... | ,, 23 | 5,498 | 6,207 | + 709 | 21 | 126,204 | + 7,151 |
| Brighton Corporation... | ,, 24 | 1,295 | 1,537 | + 242 | 21 | 25,186 | + 1,183 |
| Bristol ..... | ,, 22 | 7,251 | 9,070 | + 1,819 | 33 | 268,688 | + 37,596 |
| British Elec. Traction— | | | | | | | |
| Airdrie..... | Aug. 22 | 330 | 402 | + 82 | 34 | 11,517 | + 1,677 |
| Barnsley ..... | ,, 22 | 356 | 404 | + 148 | 34 | 9,428 | + 3,534 |
| Barrow ..... | ,, 22 | 458 | 506 | + 48 | 34 | 13,944 | + 952 |
| Birmg.& Mid. Joint— | | | | | | | |
| Birmingham Dist. ... | Aug. 22 | 958 | 975 | + 17 | 34 | 24,122 | + 1,466 |
| Dudley—Stourbridge | ,, 22 | 980 | 1,063 | + 83 | 34 | 32,672 | + 2,732 |
| South Staffordshire... | ,, 22 | 988 | 1,020 | + 32 | 34 | 31,789 | + 2,294 |
| Wolverhampton Dist. | ,, 22 | 513 | 557 | + 44 | 34 | 17,555 | + 1,319 |
| Devonport ..... | ,, 22 | 519 | 668 | + 149 | 34 | 18,729 | + 570 |
| Gateshead ..... | ,, 23 | 1,118 | 1,603 | + 490 | 34 | 42,895 | + 8,243 |
| Gravesend & N'thfleet | ,, 22 | 236 | 360 | + 124 | 34 | 8,018 | + 1,035 |
| Greenock—P.Gl'gow | ,, 23 | 887 | 1,167 | + 280 | 34 | 29,867 | + 2,797 |
| Jarrow ..... | ,, 22 | 164 | 188 | + 24 | 34 | 5,009 | + 886 |
| Kidderminster ..... | ,, 22 | 130 | 156 | + 26 | 34 | 4,329 | + 210 |
| Merthyr ..... | ,, 22 | 210 | 233 | + 23 | 34 | 7,527 | + 863 |
| Metropolitan ..... | ,, 23 | 8,519 | 9,239 | + 719 | 34 | 305,189 | + 8,045 |
| Middleton ..... | ,, 22 | 390 | 464 | + 74 | 34 | 13,147 | + 791 |
| Oldham—Ashton..... | ,, 22 | 647 | 721 | + 74 | 34 | 21,093 | + 522 |
| Peterborough ..... | ,, 22 | 156 | 261 | + 105 | 34 | 6,059 | + 1,413 |
| Potteries ..... | ,, 22 | 1,912 | 1,982 | + 70 | 34 | 70,402 | + 7,583 |
| Rothesay ..... | ,, 22 | 497 | 742 | + 245 | 34 | 9,122 | + 902 |
| Sheerness ..... | ,, 22 | 68 | 77 | + 9 | 34 | 1,840 | + 132 |
| South Metropolitan... | ,, 22 | 867 | 936 | + 69 | 34 | 28,585 | — 297 |
| Southport ..... | ,, 22 | 372 | 461 | + 89 | 34 | 11,085 | + 853 |
| Swansea ..... | ,, 23 | 1,260 | 1,371 | + 111 | 34 | 42,830 | + 4,129 |
| Taunton ..... | ,, 22 | 55 | 61 | + 6 | 34 | 1,646 | + 121 |
| Tynemouth..... | ,, 22 | 439 | 518 | + 79 | 34 | 9,552 | + 1,001 |
| Weston-super-Mare ... | ,, 22 | 367 | 553 | + 186 | 34 | 6,284 | + 1,183 |
| Worcester ..... | ,, 22 | 358 | 446 | + 88 | 34 | 10,939 | + 955 |
| Wrexham & District.. | ,, 22 | 122 | 142 | + 20 | 34 | 4,172 | + 457 |
| Yorks (Woollen) Dist. | ,, 22 | 1,147 | 1,175 | + 28 | 34 | 39,072 | + 2,822 |
| Burnley Corporation ... | ,, 23 | 1,516 | 1,684 | + 168 | 21 | 36,182 | + 4,794 |
| Burton-on-Trent Corp. | ,, 24 | 299 | 302 | + 3 | 21 | 6,163 | + 768 |
| Bury Corporation..... | ,, 24 | 1,243 | 1,305 | + 62 | 21 | 28,836 | + 915 |
| Cardiff Corporation..... | ,, 2 | 2,545 | 2,955 | + 410 | 18 | 48,759 | + 5,078 |
| Chatham and District.. | ,, 21 | 947 | 1,079 | + 132 | 33 | 30,427 | + 1,500 |
| Chesterfield Corp. ..... | ,, 21 | 221 | 268 | + 47 | 20 | 5,376 | + 680 |
| Colne & Trawden..... | ,, 23 | 259 | 296 | + 37 | 34 | 9,367 | + 611 |
| Cork Electric..... | ,, 21 | 497 | 579 | + 82 | 33 | 16,606 | + 178 |
| Croydon Corporation ... | ,, 15 | 1,657 | 1,615 | — 42 | 19 | 33,299 | — 4,211 |
| Darlington Corporation | ,, 23 | 225 | 240 | + 15 | 21 | 5,249 | + 495 |
| Derby Corporation ..... | ,, 23 | 952 | 1,001 | + 49 | 21 | 20,837 | + 2,231 |
| Dover Corporation ..... | ,, 16 | 324 | 350 | + 26 | 20 | 5,085 | — 157 |
| Dublin & Lucan ..... | ,, 22 | 162 | 213 | + 51 | 7½ | 1,486 | + 200 |
| Dublin United ..... | ,, 23 | 5,796 | 6,655 | + 929 | 33 | 202,529 | + 6,725 |
| Dundee City ..... | ,, 20 | 1,211 | 1,330 | + 119 | 14 | 18,601 | + 1,592 |
| East Ham Corporation | ,, 23 | 1,135 | 979 | — 156 | 21 | 21,513 | — 855 |
| Exeter Corporation ..... | ,, 22 | 354 | 405 | + 51 | 21 | 7,457 | + 283 |
| Gearless Motor 'Buses. | ,, 23 | ... | 602 | ... | 20 | 9,065 | ... |
| Glasgow Corporation ... | ,, 23 | 18,153 | 19,653 | + 1,500 | 13 | 236,021 | + 17,200 |
| Glossop(U.Elec.Supply) | ,, 23 | 112 | 127 | + 15 | 34 | 4,377 | + 504 |
| Halifax Corporation ... | ,, 19 | 2,129 | 2,366 | + 237 | 20 | 44,371 | + 416 |
| Hastings & District..... | ,, 21 | 1,628 | 1,904 | + 276 | 34 | 34,578 | + 2,299 |
| Huddersfield Corp. ..... | ,, 23 | 2,023 | 2,145 | + 122 | 21 | 45,226 | + 2,841 |
| Hull Corporation ..... | ,, 23 | 2,957 | 3,046 | + 89 | 21 | 63,945 | + 3,190 |
| Ilford U.D.C. ..... | ,, 23 | 463 | 453 | — 10 | 21 | 9,682 | — 1,599 |
| Ilkeston Corporation ... | ,, 27 | 126 | 145 | + 19 | 22 | 2,901 | + 541 |
| Ipswich Corporation ... | ,, 23 | 536 | 583 | + 57 | 19 | 10,107 | + 138 |
| Isle of Thanet ..... | ,, 23 | 1,809 | 2,141 | + 332 | 47 | 29,484 | + 1,279 |
| Kilmarnock Corp. ..... | ,, 23 | 161 | 171 | + 10 | 14 | 2,641 | + 179 |
| Lanarkshire ..... | ,, 21 | 1,584 | 1,795 | + 211 | 33 | 55,162 | + 7,035 |
| Lancashire United ..... | ,, 20 | 1,442 | 1,716 | + 274 | 33 | 50,222 | + 5,307 |
| Leeds City ..... | ,, 23 | 7,806 | 8,386 | + 580 | 21 | 174,960 | + 11,351 |
| Leicester Corporation... | ,, 23 | 2,563 | 2,790 | + 227 | 34 | 94,298 | + 8,698 |
| Leith Corporation ..... | ,, 23 | 668 | 729 | + 61 | 14 | 10,730 | + 272 |
| Liverpool Corporation.. | ,, 23 | 11,853 | 13,271 | + 1,418 | 33 | 483,718 | + 31,975 |
| Llandudno & Colwyn B. | ,, 22 | 835 | 891 | + 56 | 38 | 12,782 | + 1,113 |
| London County Council | ,, 20 | 32,502 | 40,360 | + 858 | 20 | 854,231 | — 21,194 |
| London Gnl. Omnibus.. | ,, 23 | 50,842 | 62,262 | + 11,420 | 34 | 2,112,041 | + 443,044 |
| London United ..... | ,, 22 | 6,843 | 7,329 | + 986 | 34 | 213,565 | + 854 |
| Lowestoft Corporation | ,, 23 | 494 | 549 | + 55 | 46 | 9,488 | + 282 |
| Maidstone Corporation | ,, 14 | 205 | 212 | + 7 | 21 | 4,147 | + 904 |
| Manchester Corp. ..... | ,, 23 | 16,452 | 17,200 | + 748 | 21 | 389,550 | + 17,982 |
| Nelson Corporation..... | ,, 23 | 201 | 227 | + 26 | 21 | 4,520 | + 273 |
| N'castle-on-Tyne Corp. | ,, 23 | 4,246 | 4,573 | + 332 | 21 | 100,567 | + 8,446 |
| Newport (Mon.) Corp.... | ,, 23 | 730 | 790 | + 60 | 21 | 15,959 | + 1,059 |
| New St. Helens & Dist... | ,, 20 | 730 | 892 | + 162 | 8 | 7,273 | + 981 |
| Northampton Corp..... | ,, 22 | 561 | 616 | + 55 | 20½ | 12,212 | + 446 |
| Nottingham Corp. ..... | ,, 21 | 3,099 | 3,245 | + 156 | 20½ | 68,574 | + 2,315 |
| Oldham Corporation ... | ,, 24 | 2,107 | 2,262 | + 155 | 22 | 48,543 | + 2,774 |
| Portsmouth Corp..... | ,, 23 | 2,585 | 3,227 | + 642 | 21 | 50,756 | + 1,750 |
| Preston Corporation ... | ,, 20 | 818 | 861 | + 43 | 21 | 18,727 | + 927 |
| Provincial ..... | ,, 23 | 2,390 | 2,947 | + 557 | 47 | 88,395 | + 5,704 |
| Reading Corporation ... | ,, 22 | 658 | 743 | + 85 | 20 | 14,390 | + 831 |
| Rochdale Corporation | ,, 23 | 1,503 | 1,665 | + 162 | 21 | 34,173 | + 1,044 |
| Rotherham Corp..... | ,, 27 | 754 | 1,074 | + 320 | 21 | 20,059 | + 5,282 |
| Salford Corporation ... | ,, 25 | 4,818 | 5,041 | + 223 | 21 | 110,793 | + 3,607 |
| Sheffield Corporation... | ,, 24 | 6,683 | 7,223 | + 540 | 22 | 158,997 | + 14,723 |
| Southampton Corp..... | ,, 20 | 1,344 | 1,538 | + 194 | 20 | 27,611 | + 1,069 |
| Southend-on-Sea Corp. | ,, 20 | 1,325 | 1,752 | + 427 | 21 | 21,374 | + 2,803 |
| South Shields Corp..... | ,, 23 | 687 | 816 | + 129 | 21 | 15,532 | + 2,085 |
| Sunderland Corp..... | ,, 24 | 1,312 | 1,557 | + 245 | 21 | 31,232 | + 3,432 |
| Sunderland District ... | ,, 20 | 502 | 656 | + 104 | 42 | 22,993 | + 4,235 |
| Swindon Corporation'... | ,, 20 | 164 | 189 | + 25 | 20 | 3,421 | + 255 |
| Trys.(M.E.T.)Omn. Co. | ,, 23 | ... | 8,384 | ... | 30 | 118,396 | ... |
| TynesideTrys.&Tmrds. | ,, 20 | 556 | 578 | + 22 | 8 | 4,228 | + 317 |
| Wallasey Corporation | ,, 23 | 1,178 | 1,411 | + 233 | 21 | 28,974 | + 2,356 |
| Walsall Corporation ... | ,, 23 | 630 | 682 | + 52 | 34 | 20,946 | + 1,413 |
| Walthamstow U.D.C.... | ,, 23 | 693 | 816 | + 123 | 21 | 16,094 | — 452 |
| Warrington Corp..... | ,, 21 | 433 | 423 | — 10 | 21 | 9,220 | + 337 |
| West Ham Corporation | ,, 21 | 2,638 | 2,662 | + 24 | 20 | 56,559 | + 1,383 |
| Wigan Corporation..... | ,, 21 | 1,298 | 1,416 | + 118 | 20½ | 30,315 | + 3,232 |
| Wolverhampton Corp | ,, 27 | 1,020 | 1,085 | + 65 | 22 | 23,596 | + 1,286 |
| Yorkshire (W. Riding) | ,, 24 | 1,363 | 1,692 | + 329 | 34 | 49,175 | + 5,500 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, August 29. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 77 — 80 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¹¹/₁₆ — 4¹⁵/₁₆ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4¾ — 4⅞ |
| 100 | Do. 4% Deb. Stk. Red..... | + ⅛ | 91¼ — 93¼ |
| 100 | Do. 4½% Deb. Stk. Red..... | + ⅛ | 96½ — 97½ |
| 100 | Do. 5% Deb. Stk. Red..... | ... | 97½ — 99¼ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref ..... | ... | 1⅛ — 1¼ |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red..... | ... | 72 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11⅛ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | + 2¾ | 95¾ — 96¾ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | + ⅛ | 7 — 7¼ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | + 1 | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¾ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 96 — 97 |
| 100 | British Columbia Elec. Ry. Co., Lim., Def. Ord. Stk. | — 1 | 125 —130 |
| 100 | Do. Pref. Ord. Stock ..... | ... | 111 —116 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | — ½ | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —102 |
| 40 | Do. 4½% Vancouver Power Debs..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | ... | 95½ — 97½ |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | + 1 | 86 — 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 46 — 49 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | + 1½ | 10½ — 12 |
| 100 | Do. Deferred Ord. Stock ..... | + ¼ | 4½ — 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | + 1 | 91 — 94 |
| 100 | Do. 4½% Second Debenture Stock, Red | + ½ | 75 — 78 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 87 — 91 |
| 100 | Buenos Ayres Lacrose Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 96½ — 98½ |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ — 6¼ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | + ½ | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ¹³/₁₆ — ¹⁵/₁₆ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5⁵/₁₆ — 5⅝ |
| 100 | Do. 4% Debenture Stock Red, 1985 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ½ | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | — ⅛ | — 8½ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | — ⅛ | — 10¾ |
| 10 | Do. do. 6% Pref. ..... | + ¼ | — 12 |
| 100 | Do. do. "A" Red. ..... | ... | — 92 |
| 100 | Do. do. Deb. Stock "B" Red. ... | + ¼ | — 79¼ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | ... | 8½ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co. Ld., Ord. ..... | ... | ⅞ — 1 |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | ³¹/₃₂ — 1 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | ... | 94½ — 96¼ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3½ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. ..... | ... | 6¾ — 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2⅛ — 2⅜ |
| 100 | Do. do. 6% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | ⁵/₁₆ — ⁵/₁₆ |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 100 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | ⅜ — 1 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¾ — 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. ..... | ... | 1⅜ — 1⅝ |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — ⅜ |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | + 1 | 97 — 99 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | — 1 | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 111 —114 |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | — ¹/₃₂ | ³³/₃₂ — 1⁷/₃₂ xd |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ... | ... | 84 — 88 |
| 100 | Do. 5% Deb. Stock, Red. ... | ... | 90 — 93 |
| $100 | Mexico Tramways Co., Common Stock ..... | ... | 99 —101 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 1½ | 91 — 93 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — 1 | 91 — 93 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | + ⅛ | 92½ — 94½ |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1932) ... | ... | 96 —100 |
| 1 | National Steam Car Co. Ltd. ..... | ... | 1⁹/₁₆ — 1¹¹/₁₆ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | — ¼ | 6¼ — 6½ xd |
| 10 | Do. do. 5% Cum. Pref. ..... | — ¼ | 5⅞ — 6⅛ ,, |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | — ⅜ | 6 — 6¼ ,, |
| 5 | Do. do. 6% Cum. Pref. ..... | — ¹/₁₆ | 4¾ — 5⅛ ,, |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. ..... | ... | 1⁵/₁₆ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | ³⁹/₆₄ — ⁴³/₆₄ |
| 1 | Do. 5% Cum. Pref. ..... | ... | ³³/₆₄ — ³⁷/₆₄ |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim. Ord. ..... | ... | ⅞ — 1 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% ... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | ... | 101 —103 |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | ... | 95 — 97 |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | + 1 | 102 —104 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8½ — 9½ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 — 89 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅝ — ¾ |
| 100 | Do. do. 6% Deb. Stk..... | + 4½ | 68 — 73 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. .... | — 1 | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 98 —100 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 88½ — 89½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 89¾ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord. ..... | ... | 4½ — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¹³/₁₆ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Ry. Co. 4½% Perp. Cons. Deb. ..... | ... | 101 —103 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅛ — ⅜ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 81 — 86 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 12. | LONDON, SATURDAY, SEPTEMBER 6, 1913. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

## WEEKLY LIST OF TENDERS INVITED.

### BINGLEY URBAN DISTRICT COUNCIL.

Invites tenders for the supply and erection of the following Electric Lighting plant :—

Section A.—Rotary Converters and Transformers.
Section B.—A.C. E.H.T. and L.T., and D.C. Switchgear.
Section C.—Low Tension Cables.

Contractors may tender for any section, but not for part of a section.

Particulars of the above sections, together with general conditions and form of tender, may be obtained from the Consulting Engineer, Walter Emmett, M.Inst.C.E., 35, Commercial Street, Halifax, on payment of two guineas, which sum will be refunded on the return of the specification filled in with a *bonâ-fide* tender, which shall not subsequently be withdrawn.

Duplicate specifications can be obtained at an additional cost of half-a-guinea each, not returnable.

Tenders, endorsed "Electric Lighting," must be delivered to me on or before noon on September 15, 1913.

The Council does not bind itself to accept the lowest or any tender.

ALFRED PLATTS,
Clerk.

Town Hall, Bingley.

### MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the following, viz. :—

(a) Beaver, Serge, and Pilot Cloths.
(b) Making-up of Uniform Clothing.
(c) Uniform Caps.

Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester.

Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, September 16, 1913.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
August 29, 1913.

### MATLOCK URBAN DISTRICT COUNCIL.

TRAMWAY CABLE.

The above Council are prepared to receive tenders for about 1,067 Lineal Yards of Patent Steel Wire Tramway Cable, with Manilla Core (3¼in. in circumference), delivered at their Depôt, Matlock, carriage paid.

Particulars, specifications, and terms as to payment may be obtained from Mr. C. P. Foster, Tramway Manager.

Tenders, accompanied by samples of wires, to be delivered at my office (marked "Cable") not later than 12 noon, Saturday, September 20, 1913.

The Council do not bind themselves to accept the lowest or any tender.

R. TAYLOR,
Clerk to the Council.

Town Hall, Matlock,
September 3, 1913.

### SOUTHAMPTON HARBOUR BOARD.

TO CONTRACTORS.

The Southampton Harbour Board is prepared to receive tenders for Providing and Laying Rails for Electric Gantry Cranes on the Town Quay, Southampton.

Drawings, specification, and conditions may be inspected upon application to Mr. E. Cooper Poole, A.M.Inst.C.E., Engineer to the Board, at the Board's Offices, Southampton, on the deposit of a sum of one pound, which deposit will be returned upon the receipt of a *bonâ-fide* tender. Sealed tenders (which must be on the printed form supplied), endorsed "Tender for Crane Rails," to be delivered to the undersigned not later than 12 o'clock noon, Saturday, September 20, 1913.

No pledge is given to accept the lowest or any tender.

By order, J. E. PAULTHORPE,
Clerk to the Board.

Harbour Board Offices,
Town Quay, Southampton,
September 1, 1913.

### VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites alternative tenders for the supply and delivery f.o.b. port of shipment and c.i.f. Port of Melbourne, fully inclusive of Australian Customs duties, etc., of the following Rails and Fishplates :—

Contract No. 25,005.—Approximately 27,079 Tons of 80lb. Steel Rails.
Contract No. 25,005.—Approximately 2,215 Tons of Steel Fishplates for 80lb. Steel Rails.

Specifications, conditions of contract, and forms of tender may be obtained by *bonâ fide* tenderers at the offices of the Consulting Engineers, John Coates and Co., Limited, 25, Victoria Street, Westminster, London, S.W.

Tenders must be delivered to the Agent-General for Victoria, Melbourne Place, Strand, London, W.C., not later than 11 a.m. on Wednesday, October 8.

A preliminary deposit equal to ninepence for each and every ton of rails and fishplates must accompany each tender.

The Government of Victoria does not bind itself to accept the lowest or any tender.

### COUNTY BOROUGH OF WIGAN.

ELECTRICITY WORKS EXTENSIONS.

The Corporation of Wigan invite tenders for the supply and erection of the following plant :—

1,500 kw. Turbo-Alternator Ejector-Jet Condenser, Pipework, and all Accessories.

Specification, with form of tender, etc., may be obtained on application to Mr. James Slevin, Borough Electrical Engineer, Bradford Place, Wigan, on payment of £3 3s. od. for each specification, which will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Turbo-Alternator, etc.," to be delivered to the undersigned on or before Saturday, the 20th instant.

The Committee do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Town Clerk's Office,
King Street West, Wigan,
September 2, 1913.

### COUNTY BOROUGH OF BURNLEY.

The Corporation invite tenders for a 4-Ton Motor Wagon, with petrol engine, for the purpose of the collection of household refuse and for street watering. Copy specification will be sent to contractors willing to tender. Tenders must reach me on or before October 12.

PEREGRINE THOMAS,
Town Clerk.

Town Hall, Burnley,
August 14, 1913.

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## POSITIONS VACANT.

### TORQUAY TRAMWAYS COMPANY, LTD.

PLATELAYER.

Applications are invited for the above position. Candidates must have experience in maintenance work, and must be able to, or willing to learn to, drive a car when required.

Applications, stating experience and wages required, together with copies of testimonials, to be forwarded to the undersigned.

H. HOLLIDAY,
Engineer and Manager.

Car Sheds, Torquay.

### LEEK URBAN DISTRICT COUNCIL.

APPOINTMENT OF ELECTRICAL ENGINEER.

The Council invite applications for the appointment of Electrical Engineer to take entire charge of their Electricity Undertaking.

Experience in three-wire D.C. supply essential.

Forms of application and list of duties may be obtained from the undersigned.

Salary £225 per annum, rising to £275 by annual increments of £10, subject to satisfactory service.

Applications, endorsed "Appointment of Electrical Engineer," to be received by me not later than 12 o'clock noon on Monday, September 15.

Canvassing not allowed.

HAROLD HENSHAW,
Clerk to the Council.

Town Hall, Leek,
September 3, 1913.

### CLERK FOR TRAMWAY OFFICE.

Clerk for Tramway Office wanted; must be good arithmetician and accurate. Wages 23s. per week, rising to 25s. at the end of 12 months' satisfactory service. Applications in own handwriting, with copies of testimonials, to be addressed to C. L. E. Stewart, Tramways Manager, Rawtenstall.

### TRAMWAY CLERK.

Wanted, Tramway Clerk, Shorthand and Typist; experience in Storekeeping desirable. Wages 20s. to 30s., according to ability and experience. Send particulars and copies of testimonials to Manager, Tramways, Colchester, stating age, wages asked, and when could commence duties.


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GARRISON LANE, BIRMINGHAM.

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RIPON, England

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PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
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JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON." Telephone: 368, LONDON WALL.

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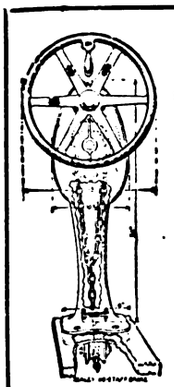

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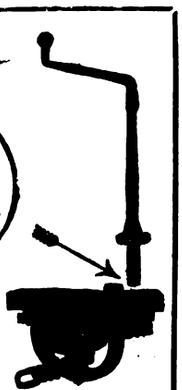


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THE
# Tramway AND Railway World

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**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, SEPTEMBER 6, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## TRAMWAY BENEFITS AND SOME INCONVENIENCES.

A dead set has been made against tramways, especially in London, not on their merits but as a party question. "Scrap them!" is the cry of the opponents; but they take good care not to weaken their case by suggesting any alternative for the present poor man's conveyance. The reason why is that a substitute does not exist except it be a tube or other underground railway. The tramways have enabled workmen to travel in their thousands from the outskirts of large towns where railway facilities do not exist, to their various occupations in the business centres, the trams taking them back at night at all hours and in any numbers. To give a concrete case:—A return ticket in London from the southern suburbs to the Temple costs 5d. by tram, 7d. by omnibus, and 9d. or 10d. by rail. If it were attempted to work the two latter means of conveyance under precisely the same conditions as to fares and rates the results would be a *débacle*. No one suggests that the trams are perfect, but no one suggests a perfect substitute for them. So the public must perforce put up with such inconveniences as are inherent in the system, for it is unimaginable that the thousands of workers and voters who now use this mode of getting to and from their work would stand, for a moment, being deprived of it by that scrapping of the tramways which is advocated by their extreme opponents. At the same time, it would be well if certain reasonable objections were minimised as much as possible; to the advantage of "the stitch in time" we have drawn attention before—but the stitch, when put in, should not be a "chain" but a "lock" stitch—in other words, and speaking of British tramways generally, any repairs when made and whenever possible, should be radical ones, not temporary alleviations of the evils. Nothing but the strictest supervision will ensure this, for it is the bent of too many workmen nowadays not only to take as long as possible over a job but to leave it so as to "make work" for their brethren, instead of saving future labour on it. This is noticeably the case in road and permanent-way repairs, which are a great source of inconvenience to all other road traffic and give rise to more complaints than any other of the "objectionable" features of a tramway. It is, of course, out of the question for all repairs to be done on Sundays or at night. The unions would not allow it except at a prohibitive cost; moreover, anything done at those times is generally not so durable as work effected during the ordinary hours of daylight; but whenever effected the greatest care should be taken that the very best work is put in so as to avoid that repetition of the whole nuisance after a short interval as so often happens. The untidiness of the cars owing to the litter of used tickets, the want of judgment in manipulating the ventilating contrivances, are comparatively small matters, but they all tell in strengthening the case against tramways as stated by their bitter critics, and it would therefore be advisable to reduce all causes of complaint to the possible minimum.

## THE MUNICIPAL TRAMWAY CONFERENCE.

Preparations are now well advanced for the twelfth annual conference of the Municipal Tramways Association, which is to be held in Sheffield from September 23 to 26. Mr. A. R. Fearnley, general manager of the Sheffield tramways, is, of course, the president for the year, while Mr. C. J. Spencer, general manager at Bradford, as honorary secretary, is having his hands well occupied in making all the necessary preparations. A copy of the main items of the programme, which has been carefully arranged, will be found in this issue. It will be seen in the first place that the Corporation of Sheffield are vieing with all other municipalities who have received the Association in the hospitality which they are offering and in the facilities for sight-seeing and obtaining information which they are placing at the disposal of the delegates. There will be the usual reception by the Lord Mayor and the Chairman of the Tramways Committee as a preliminary to the opening of the Conference proper. After Mr. Fearnley has delivered his presidential address, a subject of very great interest at the present time will come on for consideration, viz., the advantages and disadvantages of platform fare collection. It is to be introduced by a paper by Alderman S. Flint, of Leicester, and the discussion is to be opened by Councillor J. A. Smith, of Aberdeen, chairmen of their respective tramway committees. It is to be noted that both of the towns represented by these gentlemen have led the way in adopting the pay-as-you-enter system, and already have cars specially adapted for the purpose running on their lines. The information which the two gentlemen will be able to place before the Conference will thus be of great importance, seeing that it comes at first hand from persons who have had practical experience, though not as yet of very long duration, of the system. There ought to be a good deal of discussion on this paper, seeing that the question of the applicability of the pay-as-you-enter principle to double deck cars is still doubted by some tramway men. With the single deck car in America it has, of course, proved an unqualified success. The next paper, which will be by Councillor W. C. Fenton, will deal with the maintenance of paving on tramway tracks, as affected by Section 28 of the Tramways Act, 1870. This is a section of the Act which gives rise to a great deal of

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grievance at the present time among tramway owners, as it is here that provision is found compelling the tramway authority to maintain the street surface between the rails and tracks and for 18 in. outside. This obligation is, of course, becoming very onerous owing to the introduction of heavy motor vehicles, which wear out the paving which the tramway undertaking has to maintain. A larger and more general subject is that of urban passenger transport, which is to be treated by Mr. J. B. Hamilton, general manager, Leeds, on the following day. The London aspect of this problem, which, of course, is the most serious one in the country, will no doubt be introduced by Alderman Littler, chairman of West Ham Tramways Committee, who is to open the discussion. Seeing that by the introduction of the motor omnibus and the trackless trolley car, questions of passenger transport by road are in a condition of flux, it may be expected that this discussion also will be particularly interesting. The Thursday afternoon is to be occupied by visits to steel works in Sheffield, and to the power station and car depôts of the tramway system. The annual dinner of the Association in the evening will really close the proceedings, except for the business meeting on the Friday morning, and an excursion to the Dukeries. On the whole, it seems tolerably certain that the members of the Association have an interesting and instructive time in front of them.

## RAILLESS TROLLEY CAR PROPOSALS.

BOURNEMOUTH.—A company propose to install a railless trolley car service from the County Gates to Canford Cliffs and the Sandbanks, in the vicinity of Bournemouth, with a view to develop one of the most charming districts on the South Coast. Replying to objections urged against the scheme, the promoters' engineers state that the poles they propose to erect would not be of the tramway type, but light poles erected wherever possible in a line with the trees, in positions where they would be practically out of sight; that the type of current collector to be used is practically noiseless; and that the wear on the roads would be considerably less than that caused by the operation of the existing petrol vehicles.

YORK.—At their September meeting the City Council referred back to the Tramways Committee for further consideration their recommendation to apply for powers to run railless trolley cars along two routes to Heworth and Haxby Road. Councillor Sharp, who moved the adoption of the report, in reply to a question stated that the terms offered with the demonstration motor omnibus which was brought to the city were altogether prohibitive. Councillor Clarke observed that the only objection that was made at the time of the trial was that the omnibus did not hold sufficient people.

ABERDEEN.—The shareholders of Aberdeen Suburban Tramways Company have given the directors authority to work railless trolley cars or other mechanically-propelled vehicles in connection with the undertaking. Replying to a shareholder, the chairman said the directors were alive to what had been accomplished in connection with 'buses in London. It would not be wise to say definitely what vehicles would be best, but there was a strong feeling in favour of motor 'buses among the directors.

## COVENTRY TRAMWAY DEVELOPMENTS.

The Coventry Corporation has commenced the extension of the tramway depôt recently sanctioned by the Local Government Board at a cost of £20,475. The scheme provides not only for the enlargement of the depôt, but also for the provision of new cars, additional cables, and signals. The new car shed will be erected alongside the existing building, and will accommodate 18 cars on six tracks, with inspection trenches. A feature of the depôt will be a mess room, with a bathroom, for the employees. The undertaking now comprises 41 cars, and five more are on order. Two of the new cars will be of the roof cover pattern, and the three others will be so constructed as to enable tops to be fitted if so desired. The cars are of the single truck type, so that the narrow streets can be negotiated with ease, and they will carry 50 passengers each. Much has lately been done to improve the service, but here the undertaking is hampered by the congestion in the streets, most of which are so narrow that speed must always be sacrificed for safety, and much of the tramway is only single track. Indeed out of the total length of 14 miles only about two are double tracked. At the power station at Priestley Bridge two 500 kw. motor converters have recently been installed for transforming the current supplied by the Corporation.

## CORPORATION TRAMWAYS IN 1912-13.

LIVERPOOL.

The annual report upon the Liverpool Corporation tramways, issued by Mr. C. W. Mallins, the manager, and notified in our issue dated April 5 last, shows that financially the year 1912 was the best on record. Over 134 millions of passengers were carried at an average fare of 1.128d per passenger. The total receipts were £668,220; operating costs, £425,018; interest, £50,096; sinking fund, £59,248; reserve and renewals, £66,929; and relief of rates, £66,929. The report also gave the results of the general manager's inquiries among the other tramway managers into contract and transfer tickets and children's fares, excerpts from which appeared in this journal on August 9.

COMPARISON OF PENNY STAGES IN 68 TOWNS

A diagram attached to a later report on contract and transfer tickets and children's fares shows the average length of the penny stage given in the working-class districts as compared with sixty-eight other undertakings throughout the country. The average length of the penny stage in Liverpool working-class areas is fully three miles, as compared with two and a quarter miles in Manchester, Birmingham, and Glasgow, two miles in Leeds, and rather under two miles in London, the distance gradually tapering down to less than a mile in Preston, Colchester, and Nelson. Sheffield, where there is a universal penny fare, does not appear in the list. A second diagram gives the average length of the penny stage on the whole of the Liverpool system, as compared with sixty-eight other towns. The longest average is that of Liverpool, 2 miles 802 yards, the shortest being Nelson, 1,495 yards; while the average for sixty-eight undertakings is 1 mile 798 yards.

NEWCASTLE-ON-TYNE.

The annual report of the general manager (Mr. Ernest Hatton) of the Newcastle Corporation tramways for the year ended March 31 last shows that the Corporation owns 56 miles of tramways, and that last year established a further record, due to the continued prosperity of local industries. The number of passengers was over 52 millions, an increase of three millions. The gross receipts were £235,321 as against £223,565 for the previous year. The traffic expenses were £64,493, an increase for the year of £3,830, due to the additional cars in service and also to higher wages. A table of statistics shows the great progress made by the undertaking. The receipts in 1905 were £197,173, and have increased with a yearly regularity to last year's record of £235,321. The surplus, which was £19,344 seven years ago, is now £38,505. The sum paid to the relief of rates last year was £13,461. A further amount of £3,300 had been charged to revenue for the purchase of motor omnibuses for the Westerhope route; and a balance of £21,189 carried to the reserve and renewals fund, which then amounted to £119,407. The percentage of gross profits for the year on the capital expenditure was 9.3 per cent. The omnibus services inaugurated on the Westerhope route had met a long-felt want in that district, and were acting as a beneficial feeder to the Fenham cars. The report indicates that this year the reserve and renewals fund will be heavily drawn upon, it being imperative to renew considerable lengths of track and several junctions. Additional plant had been provided at the power station to meet the increasing demand for power. Mr. Hatton says that the undertaking has now reached a stage when renewals must be encountered annually and not occasionally, as in the past. While there was no occasion for doubt and uneasiness as to whether the undertaking could meet these expenses, so long as a firm policy was pursued in resisting all attempts to deplete the net annual revenue by saddling it with still heavier charges than it now carried, on the other hand, if that policy were not pursued, the undertaking might eventually have to be supported out of the rates.

## FAILURE OF THE DUBLIN TRAMWAY STRIKE.

The partial strike of Dublin tramway workers has been associated with sanguinary scenes due to the bitter feeling created by the agitators. On Saturday there was fierce rioting, during which one man was killed and hundreds of others injured. The rioting began with attacks on the tramcars, for, despite the strike, a good service has been maintained with the aid of police riding on the platforms. Mounted police also patrolled the routes. The strikers arranged for a meeting in Sackville Street on Sunday. This was proclaimed, but Mr. Larkin and his followers announced their intention of holding the meeting. A warrant was issued on Saturday for the arrest of Larkin and others on charges of sedition and incitement, but in Larkin's case the police were unable to execute it. He appeared at the window of an hotel on Sunday, and, tearing off a false beard, attempted to hold a meeting. He was arrested, and has been remanded without bail. To mark appreciation of the action of the majority of the tramwaymen who have so loyally stood to their posts, a Citizens' Committee has opened a fund for the purpose. It is being liberally responded to At a meeting of 400 employers of labour a resolution was passed declaring that the position created by the Irish Transport and General Workers' Union (a union in name only) is a menace to all trade union organisation, and has become intolerable. In consequence of two of the employees at the car works having refused to repair cars which had been damaged by strikers, they were discharged. The other workmen then ceased work. Mr. Murphy, the chairman of the company, has stated that it will be rather a convenience to close down the works for a time.

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## THE MUNICIPAL TRAMWAY CONFERENCE.

The programme for the twelfth annual Conference of the Municipal Tramways Association, to be held in Sheffield from September 23 to 26, has just been issued. Omitting visits, excursions, etc., the following are the main items of the programme :—

**TUESDAY, SEPTEMBER 23.**

8 p.m. Informal reception at the Royal Victoria Station Hotel.

**WEDNESDAY, SEPTEMBER 24.**

10 a.m. Meeting of the Executive Council.

10.15 a.m. Reception by the Lord Mayor and the chairman of the Sheffield Tramways Committee.

10.30 a.m. Conference.

Presidential Address by Mr. A. R. Fearnley, general manager, Sheffield Corporation Tramways.

Paper :—"Advantages and Disadvantages of Platform Fare Collection," by Mr. Alderman S. Flint, chairman, Leicester Corporation Tramways Committee.

1 p.m. Luncheon at the Grand Hotel, at the invitation of the Tramways Committee.

2.30 p.m. Resumption of Conference.

Paper :—"The Maintenance of Paving on Tramway Track as affected by Section 28 of the Tramways Act, 1870," by Mr. Councillor W. C. Fenton.

10.30 p.m. Supper at the Town Hall at the invitation of the Lord Mayor.

**THURSDAY, SEPTEMBER 25.**

9.45 a.m. Meeting of the Executive Council.

10 a.m. Meeting of the Managers' Section.

10.30 a.m. Conference resumed.

Paper :—"Urban Passenger Transport," by Mr. J. R. Hamilton, general manager, Leeds Corporation Tramways.

12.45 p.m. Luncheon at the Royal Victoria Station Hotel, at the invitation of the Tramways Committee.

2.30 p.m. Visits to works.

7 p.m. Annual Association Dinner at the Royal Victoria Station Hotel.

**FRIDAY, SEPTEMBER 26.**

9 a.m. Meeting of the Executive Council.

9.30 a.m. Annual business meeting.

The headquarters of the Association during the Conference will be the Royal Victoria Station Hotel. Special arrangements have also been made at the Grand Hotel, the King's Head Hotel, and the Albany Temperance Hotel.

## REPORT ON A NEWCASTLE COLLISION.

Lieut.-Colonel von Donop, of the Board of Trade, has reported upon the accident which occurred on June 21 on the Newcastle Corporation tramways. A car, with a partially disabled hand-brake, was being driven empty along Elswick Road, when the driver lost control and it collided with a car standing on the same line. The car which ran away was fitted with the Newell magnetic slipper brake, supplied by the Westinghouse Company, and with the usual hand-brake working blocks on the wheels. It was a single-truck double-decked car, with a top cover. The driver of the runaway car reported the disablement of the hand-brake, but was advised to continue his circular tour before sending the car back to the depôt. A fitter named Urwin and a time-keeper, Fairless, took charge of the car and proceeded to take it to the depôt. Urwin attributes the accident to the failure of the magnetic brake, but subsequently the brake was proved to work excellently. The report proceeds :—"Under these circumstances, it seems very improbable that it was a defect in the brake which caused its failure to act, and it is more likely that it was due to some error on Urwin's part in the application of it. Urwin had been in the employ of the Corporation for 11 years, during the last five of which he had been employed as a fitter. His experience as a fitter, in erecting and testing the equipment of cars, must have made him thoroughly acquainted with the working of them, and he should therefore have been quite capable of driving a car. But he had never been really trained as a motorman, and he had not had any continuous experience of driving cars, so a mistake on his part when acting as motorman is not surprising." Colonel von Donop's opinion is that some mistake was made by Urwin in the application of the brake which thereby neutralised its action, and that he did not attempt to rectify it until too late. The three causes to which this accident must be attributed are therefore as follow :—Firstly, the fact of the car not having been at once taken out of service when it was found to be defective; secondly, the omission to apply the hand brake from the rear end of the car when it came to a stand at the big lamp; thirdly, the want of skill and resource on the part of fitter Urwin in the use of his brakes when the car first started away from rest. In the face of this accident, the Corporation should consider the advisability of fitting their Westinghouse magnetic brakes with the mechanical attachment which allows of the slipper being applied by hand as well as electrically.

## MISCELLANEOUS NEWS AND NOTES.

**New Route at Birmingham.**—The Hagley Road route has been completed and opened. The new line is just over two miles long.

**Prosperity at Torquay.**—The Torquay tramways carried 118,425 passengers during the three days of the regatta, as against 84,281 last year.

**New Depot for Leeds.**—The City Council have received sanction for the borrowing of £29,000 for a new tramway depôt in Sovereign Street.

**First-Class Car Experiment at Birmingham.**—In response to a request from the residents of the Hagley Road district the Tramways Committee have agreed to make an experiment in running first-class cars.

**The Petrol-Electric Tramcar.**—The latest route upon which the London County Council are running a petrol-electric tramcar is between London Bridge and Greenwich Church, *viâ* Tooley Street and Bermondsey.

**Site for a New Depot at Leeds.**—The Tramways and Electricity Committee have arranged to purchase 4,625 square yards of land, at Guiseley, for the purpose of an additional depôt and sub-station, at the price of 2s. per yard.

**Manchester's Hourly Night Service.**—The City Council on September 3 agreed to the Tramways Committee's recommendation for the running of an hourly service all night, and the cars began running early the following morning.

**Zone Fares.**—A suggestion for zone fares is being put forward in Glasgow. It is urged that the tramways department should follow the precedent of the railway companies and grant concessions to regular travellers by issuing zone tickets.

**Facilities for Footballers.**—The Tramways Committee of the Newport Corporation has decided to recommend special facilities being granted on Saturdays during the football season to those attending matches at the Athletic Ground and Somerton Park.

**Glasgow Going Ahead.**—For the first quarter of the financial year of the Glasgow Corporation tramways ended on August 31 the traffic receipts are £19,000 above the corresponding period of last year. The number of passengers carried increased by 6,000,000.

**Aluminium Sheets.**—The British Aluminium Company have issued a card suitable for hanging up, giving a great deal of useful information in regard to weights, dimensions, etc., of aluminium sheets, along with comparisons with weights of sheets made of other metals. A large number of gauges are included.

**Linking Up Swansea.**—The new tramway through the recently widened Castle Street, Swansea, which will have the effect of linking up all the tramway sections of the town, and giving a through run from Morriston to the Docks, is now almost completed. The Board of Trade inspection may take place during the current month.

**York Tramway Enterprise.**—The Corporation tramways reaped a golden harvest during the recent races, and the new South Bank extension was largely patronised. Mr. Chipper, the traffic manager, put every available car on the route, and most of them were crowded. The new route affords a speedy and convenient journey to the racecourse.

**The Ackley Brake and Supply Company** of New York make a special invitation to any tramway or railway men from abroad who may be attending the electric railway convention at Atlantic City, from October 13 to 17, to make the company's stand at the exhibition held in connection with the convention their headquarters during their stay.

**Blackpool Tramway Records.**—Mr. C. Furness, manager of the Corporation tramways, reports fresh records in traffic receipts. Every day the receipts are showing an increase of over £100 as compared with last year, and every week there is an increase of about £1,000. In August the single deck open cars, running on the circular route, which are taking about £800 a week, showed an increase of £1,000.

**Posters on Tramcars.**—The latest poster on the Glasgow tramcars is issued by the Health Department. It takes the form of a black-bordered notice which gives an eye-arresting picture of a gigantic fly about to settle on a baby crawling on the ground, and which bears the words, printed in large type, "Kill that fly, and do it now." The aggressiveness of the poster is emphasised by the placing of four copies on each car.

**The Charge for Current at Aberdeen.**—The Town Council have decided that the charge to the Tramways Committee for current shall remain for another year at the present rate of .85d. per unit, subject to revision at the end of the year with a view to a reduction should the circumstances warrant it. It was thought that to lower the charge now would be to jeopardise the electricity undertaking for the benefit of the tramways.

**Return and Dinner-Hour Tickets at Darwen.**—The Tramways Committee have decided to give a three months' trial from October 1 to a scheme submitted by Mr. F. G. S. Hosken, the manager and engineer, for the issue of a 2d. return ticket on the Bolton Road section and a 1d. return dinner-hour ticket on all sections between 12 and 1 o'clock on the outward journey, the return portion to be available not later than 2 o'clock.

**Stirling Tramways and Electrification.**—The Town Council had a special meeting on September 1 to consider the offer of Mr. George Balfour, London, to purchase the electric light undertaking as a preliminary to the electrification of the tramways. The price which Mr. Balfour proposed to pay for the undertaking was the sum which would relieve the Corporation from all outstanding indebtedness. The Council decided to ask Mr. Balfour to submit details of his offer.

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**The Useful Tramcar.**—The suggestion is being put forward in Manchester that letter-boxes should be placed on the all-night cars so that people can catch the post in town instead of dropping their letters in suburban pillar boxes where the collections are made early in the evening.

**Farthing Fares.**—A correspondent ventilates a grievance against the Kidderminster and Stourport Electric Tramway Company. He says:—"I have been told by more than one official of the Tramway Company that farthings are always accepted and given in change, but this is not so, as on more than one occasion they have refused to give me the farthing. There are 1¼d. stages, and as they can issue 1½d. tickets how is it that one cannot obtain 1¾d., 2¾d., or 3¼d. tickets, as the case may be?"

**New Circular Route at Liverpool.**—By the construction of simply three new curve junctions, without the addition of any straight line, the Tramways Committee have decided upon instituting a new circular and alternative route. This will connect the centre of the city with Netherfield Road and the north docks, forming practically a duplicate track. For the round journey of five miles twopence will be charged. The route will probably be opened before the end of the year, Mr. J. A. Brodie, the engineer, having arranged to begin the work as soon as possible.

**South Lancashire Tramways and a Bridge Difficulty.**—Consent at last having been given by the Board of Trade, the running of cars has begun over the new tramway from Farnworth through Little Hulton to Walkden. The trouble arose in connection with an objection by the London and North Western Railway Company, which alleged that a bridge was not safe enough. The point has not yet been settled, but the South Lancashire Tramways Company are getting over the difficulty by calling upon passengers to change cars at the bridge for others in waiting on the other side.

**Bristol Tramways Company's Tours.**—Successful holiday tours have been arranged by the Bristol Tramways and Carriage Company (Bath Branch). The first of the six days' tours concluded on August 30. The party travelled by one of the latest road motors through West and North Wales. Mr. Seckington, traffic superintendent, travelled with the party, and the passengers presented him with a silver cigarette case suitably inscribed. There was also a pleasant two days' week-end tour to Southsea, when the party was accompanied by Mr. A. B. Bryant, the local manager.

**Motor Omnibuses for Marple and Stockport.**—Marple Urban Council have granted two licenses to Mr. J. Clayton, of Offerton, on behalf of the British Automobile Traction Company, London, to run motor 'buses between Marple and Stockport. An hourly service is to be run, and there will be a more frequent service later if the traffic warrants it. Mr. Clayton's letter stated that the same company were also going to run a service between Poynton and Newtown *viâ* High Lane and Disley, and at Marple there would be a garage containing other 'buses for other routes which it was proposed to open up. The vehicles will be single-decked.

**Proposed Link Between Middlesex and London United Tramways.**—At the meeting of the Acton District Council the Clerk presented a report with reference to the meeting between representatives of the Council and the Middlesex County Council concerning the proposed linking-up of the Middlesex tramways with the London United system. The engineer and tramway manager of the County Council, he stated, submitted a plan for the connection between the two systems by way of King Street. After considering the advantages and disadvantages of this route the members inspected a suggested connection by way of the Steyne, either through Rectory Road or Steyne Road.

**By Tramcar to the Hop Gardens.**—It is now possible to travel from the Thames Embankment to the hop gardens and orchards of Mid-Kent practically all the way by tramcar. The first stage is to Woolwich. From thence another car can be taken to Wickham Road to meet the tramway which goes to Bexley, and the journey can be continued by the service running to Dartford. A tramcar can be taken to Horn's Cross a few miles further on. A two-mile walk enables a car to be taken from Swanscombe to Gravesend and Milton. Another two-mile walk brings one in touch with the tramways round about Rochester and Chatham, and then Rainham can be reached by car. This journey extends over 34 miles and costs 2s.

**The Dispute in the Ashton District.**—The threatened strike of tramwaymen at Ashton was postponed for a ballot of the men to be taken on the final offer of the three tramways authorities concerned, with the result that the employees decided against striking. The Tramways Committee of the Joint Board draw attention to the fact that out of 35 tramways in Lancashire and Cheshire 17 were paying less than the terms now offered to the men, eight were paying the same, and ten (including Manchester and Salford) were paying more. The Tramways Committee also point out that the terms offered would cost the Board an additional sum of £1,000 per annum, whilst the terms the men ask for would entail an additional cost of upwards of £2,000 per annum.

**Berlin's New Electric Railway.**—The new electric railway in Berlin between Gesunbrunnen and the suburb of Neuköln is to be proceeded with without further delay. The scheme was brought forward six years ago, but has only recently received the sanction of the authorities. The railway will be a combination of the overhead and underground type, similar to the existing Berlin Elevated and Underground Railway, but, owing to the insistence of the municipality, a larger portion than originally proposed must be constructed underground. This, of course, will increase the cost, and the municipality has agreed to give £205,000 towards the additional cost. The railway will be nearly six miles long, and will cost between four and five millions. The traffic is estimated at 60 million passengers per year, and fares will range from 1½d. to 2½d. There is reason to believe that the rival scheme for an elevated electric railway will be abandoned.

**Glasgow Tramwaymen.**—At the last meeting of the Glasgow Corporation it was decided to make no change in the working hours of motormen and conductors. A proposal to reduce the hours from 51 to 48 per week was rejected, it being pointed out that this concession would cost £14,200 a year. The chairman of the Tramways Committee stated a petition had been received asking that if the Committee were going to consider hours and wages they should give an increase in wages and not a reduction of hours. It was decided that as from June 1 last till May 31, 1914, the wages of motormen and conductors who have been in the service over six years be 34s. per week, an increase of 1s., and that as from June 1 the wages of motormen and conductors who have been in the service over seven years be 35s. per week.

## CONTRACTS AND ORDERS.

**Bacup Council** have given a contract to W. T. Glover and Co., Limited, for the supply and laying of 4,000 yards of cable.

**Siemens Bros'. Dynamo Works, Limited,** have been awarded the yearly contract for the supply of "Tantalum" traction lamps for Rotherham Corporation tramways.

**Salford Council** have placed contracts as subjoined:—Ferranti, Limited, three-phase to two-phase switchgear, including static transformers, £1,085; Switchgear and Cowans, Limited, regulators for above switchgear, £283 10s.

**Plymouth Tramways Committee** have accepted an offer by the contractors for the supply of clothing to the tramway employees to extend the period of the contract from one to three years, and to allow a reduction of 2½ per cent. in price.

**Halifax Tramways Committee** have allotted a contract to Bolckow Vaughan and Co., Limited, for the supply and delivery of 200 tons of steel girder rails and 7 tons of steel fishplates, at £7 per ton, subject to the rails being made in this country.

**Accrington Council** have placed contracts as appended:—Armoured cable, W. T. Glover and Co., Limited; switch panels at Clayton-le-Moors sub station and Rishton Paper Mills terminus, British Thomson-Houston Company; 250 kw. motor converter, Bruce Pebbles and Co.; one 100 k.v.a. and one 200 k.v.a. static transformer and one oil switch, British Westinghouse Company, Limited.

**Bournemouth Council** have placed a contract with W. Griffiths and Co. for reconstruction of tramways in Wimbourne Road, Charminster Road, and from Park Gates West to Poole terminus, including Thermit joints on each section, at £14,621 15s. There were seven tenders. The tender of Walter Scott, Limited, has been accepted for the supply of rails and fastenings, at £9,067 10s.

**Perth (W.A.) Council** have placed the following contracts:—Power station buildings, complete boiler house equipment and other plant, Babcock and Wilcox, Limited, £124,424; turbo-alternators, transformers, and motors, Willans and Robinson, Limited, £30,982; traction rotary converters, British Westinghouse Electric and Manufacturing Company, Limited, £9,863; condensing plant, pumps, and piping, Willans and Robinson, Limited, £23,251.

## PERSONAL.

**Mr. R. W. Willis** has resigned his position as chief assistant electrical and mechanical engineer to Swindon Corporation, in order to become principal assistant to Mr. R. A. Smith, consulting engineer, Westminster.

**Mr. W. Corin,** chief electrical engineer, New South Wales Public Works Department, is visiting Great Britain, the Continent, and America, with a view to studying bulk supply and transmission questions.

**Mr. Seckington,** traffic superintendent of the Bath road motor vehicle branch of the Bristol Tramways and Carriage Company, was presented with a silver cigarette case, suitably inscribed, by the passengers who took part in the first of the six-day tours which concluded on August 30.

**Mr. J. M. McElroy,** general manager of Manchester Corporation tramways, has just gone on a visit to the Continent to study traffic conditions, in continuation of the attention which he gave to the question during the recent visit to America. Among other places he will visit are Paris, Vienna, Berlin, and Hamburg. On his return he will make a full report to the Corporation as to methods adopted in various cities, and on the question of how best to deal with the traffic problem in Manchester.

**Mr. F. J. S. Hoskens,** general manager and engineer, Darwen Corporation tramways, is the subject of a complimentary notice in a local journal in connection with his proposal (adopted by the Tramways Committee) for the issue of a return ticket on the Bolton Road section and a penny return dinner-hour ticket on all sections to or from the Circus. The writer observes that since Mr. Hoskens was appointed to the position of manager with full control he has introduced many reforms which have worked well and been appreciated.

**Mr. Henry Mozley,** general manager of Burnley Corporation tramways, has accepted nomination to the position of vice-president of the Burnley and District Chamber of Commerce. He has also been appointed to represent that Chamber at the annual autumn meeting of the Association of Chambers of Commerce of the United

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Kingdom, to be held at Antwerp on September 16 and 17. The members of the Associated Chambers will on that occasion pay visits to Ghent and Brussels, and they will be entertained by the British Chambers of those cities.

**Mr. W. Wyld,** formerly borough electrical engineer and tramways manager at Birkenhead, is to be entertained at dinner by a number of friends on October 3, at 60, Regent Street, W., to mark his appointment as chief electrical engineer to the Borough of Hampstead. Applications for tickets should be made to Mr. C. N. Russell, 29, Southwood Avenue, Highgate, or to Mr. E. P. Barfield, "Porlock," Athenæum Road, Whetstone, N. Until quite recently Mr. Wyld was a member of the Council of the Tramways and Light Railways Association.

**Bradford Tramways Committee** have received a resolution from the local branch of the Amalgamated Association of Tramway and Vehicle Workers tendering to the chairman and members their thanks for the generous manner in which the committee dealt with an application for an advance of wages for conductors and others. "It will, no doubt," states the letter in which the resolution was communicated, "give some degree of satisfaction to both the chairman and the committee to know that amid the unrest and friction that prevails at the present time on other systems the staff of the Bradford tramways are able to adjust any little difficulty without anything of the kind." Acknowledgment is also made of the unfailing courtesy and consideration with which the tramways manager (Mr. C. J. Spencer) has at all times met the men, and the hope is expressed that the better conditions of service now prevailing may result in an ever higher standard of service than that which has obtained in the past.

**Mr. C. T. Hargreaves** was killed by electric shock on August 23 at Santos, Brazil, where he was engaged with the Santos City Improvements Company. Mr. Hargreaves, who was 29 years of age, was formerly an electrician in the Blackpool tramways department.

## FINANCIAL REPORTS AND MEETINGS.

**The British Electric Traction Company.**—The receipts of all the associated companies of the British Electric Traction Company for the week ended August 29 amounted to £55,052. Upon such of the lines as were working both last year and this year the receipts show an increase of £3,384 upon the week.

**Doncaster Tramways.**—The accounts of the Doncaster Corporation for the year ended March 31 last show, with regard to the tramways, that in 1911-12 there was a deficiency of £53, the expenditure being £17,856 and the income £17,802. Last year the income was £20,347, and the expenditure £19,057, leaving a net profit of £1,290.

**Dumbarton Tramways First Dividend on Ordinary Shares.**—At the general meeting on September 1 the directors recommended a dividend on the ordinary shares for the first time of 1½ per cent. per annum on the issued and paid up ordinary share capital. A dividend on the preference shares at the rate of 6 per cent. per annum was also declared. Mr. George Balfour, the chairman, said the total receipts for the year amounted to £22,052, an increase of £578, against which increased expenses had been incurred amounting to £1,015.

**Continued Progress at Preston.**—The annual accounts of the Corporation tramways show an increase of £2,609 on the traffic receipts as compared with the previous year, in which those of 1911 had been exceeded by £2,581, the earnings per mile being 10.50d., as compared with 10.34d., while the working expenses per mile remained at 5.96d. The cost of repairs and maintenance (£6,263) amounted to £416 as compared with the previous year. After charging interest and sinking fund, the tramway surplus for the year is £9,023, of which £3,648 has been expended in three new cars, top decks to five others, new shelter on the Garstang Road, etc., leaving £5,374 to be carried to the reserve fund, which now stands at £36,840. The tramway sinking fund amounts to £42,091.

**Aberdeen Suburban Tramways Company.**—The half-yearly meeting of the shareholders was held on August 29. Mr. G. J. Walker, Portlethen, chairman, in moving the adoption of the report, which recommended a dividend of 2½ per cent., said the directors had had under their serious consideration the question of extending the company's operations by the working of railless trolley cars or other mechanically-propelled vehicles, and they were satisfied that the working of such vehicles would not only be profitable in itself, but would be profitable as a means of attracting fresh traffic to the company's undertaking. Mr. F. T. Garden, in seconding, said that the report was most satisfactory. He moved:—"That the shareholders of the company authorise and empower the directors to work trackless cars or other mechanically-propelled vehicles in connection with the company's undertaking." The report was adopted.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom for the week ended August 30 amounted to £258,567, or £14,269 more than in the corresponding week last year, while the track mileage was 2,712, or 52 more than for the corresponding week. The receipts were at the rate of £95 6s. 10d. per track mile, an increase of £3 10s. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

September 5, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, Sept. 5. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 73 7 6 | 71 5 0 | 78 16 3 |
| ,, (three months) .. .. | 72 17 6 | 71 3 9 | 79 8 9 |
| Electrolytic Copper—bars or ingots .. | 76 5 0 | 74 10 0 | 81 15 0 |
| Aluminium—bars or ingots .. .. .. | 86 0 0 | 86 10 0 | 78 0 0 |

## COAL MARKET.

September 5, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, Sept. 5. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 | 25 6 | 22 6 | 22 3 |
| Best Seconds .. .. | 24 0 | 24 6 | 21 9 | 21 3 |
| Ordinary Drys .. .. | 21 0 | 22 0 | 20 3 | 19 3 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | 19 3 | 19 0 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 17 9 | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 | 21 0 | 17 3 | 18 3 |
| Best Seconds .. .. | 19 6 | 20 0 | 16 6 | 17 3 |
| Ordinary Drys .. .. | 16 6 | 17 6 | 15 0 | 15 3 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 14 0 | 15 0 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 12 6 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 14 9 | 15 0 | 14 0 | 11 3 |
| Best Seconds .. .. | 13 6 | 13 9 | 12 3 | 10 0 |
| Smalls .. .. .. | 8 6 | 9 3 | 9 3 | 5 6 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Sept. 2 | £48,310 | £53,074 | 35 | £1,937,686 | +£170,215 |
| Auckland..... (28 days) | Aug. 1 | 18,353 | 18,960 | 4 | 22,067 | + 209 |
| Ballarat and Bendigo | July 20 | 781 | 805 | 16 | 14,364 | — 139 |
| Bombay ..... | Aug 1 | 2,765 | 3,033 | 31 | 96,134 | + 4,218 |
| Brazilian St. Rly. Mlrs | July | 41,756 | 49,056 | 52 | 545,185 | + 24,923 |
| Brazilian Traction..... | Aug. 23 | 84,956 | 94,134 | 34 | 3,012,344 | + 437,488 |
| Brisbane ..... | July | 23,060 | 26,205 | 30 | 177,208 | + 46,494 |
| British Columbia .....$ | June | 498,306 | 543,186 | 52 | 6,812,309 | +1,062,160 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacroze... | July | 42,052 | 45,324 | 4 | 45,324 | + 3,272 |
| Calcutta.....Rs. | Aug. 30 | 59,244 | 63,712 | 35 | 22,23,416 | + 1,09,321 |
| Cape Town ..... | July | 10,875 | 11,417 | 30 | 86,900 | + 5,182 |
| Carthagena & Herreria | August | 2,151 | 2,192 | 34 | 23,317 | + 6,183 |
| East India ..... | August | 1,922 | 2,005 | 4 | 2,005 | + 83 |
| Kalgoorlie..... | July | 2,993 | 2,796 | 30 | 20,022 | + 1,628 |
| La Plata..... | August | 3,601 | 4,641 | 8 | 40,983 | + 9,040 |
| Lima..... | July | 32,239 | 34,410 | 30 | 232,637 | + 10,261 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Aug. 31 | 26,683 | 28,084 | 34 | 430,205 | + 31,655 |
| Melbourne ..... | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico .....$ | July | 570,619 | 610,602 | 30 | 3,876,142 | + 34,102 |
| Montevideo..... | August | 26 249 | 28,829 | 34 | 316,431 | + 26,324 |
| Para ..... | Aug 31 | 3,730 | 3,553 | 39 | 156.974 | + 1,575 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,021 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | July | 3,126 | 3,236 | 30 | 25,127 | + 6,662 |
| Shanghai .....$ | Aug. 27 | 18,840 | 23,460 | 34 | 734,652 | + 78,266 |
| Singapore .....$ | Aug. 30 | 10,069 | 12,089 | 35 | 413,370 | + 50,662 |
| Toronto .....$ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....$ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Central London..... | Aug. 30 | £4,421 | £3,631 | 35 | £170,193 | +£10,810 |
| City and South London | ,, 30 | 2,811 | 2,464 | 35 | 97,963 | — 9,437 |
| Liverpool Overhead..... | ,, 31 | 1,629 | 1,749 | 35 | 60,134 | + 4,784 |
| London Electric..... | ,, 30 | 11,500 | 10,505 | 35 | 477.875 | + 3.795 |
| Mersey ..... | ,, 30 | 2.051 | 2,082 | 35 | 77.793 | + 4.984 |
| Metropolitan ..... | ,, 31 | 15,803 | 15 358 | 35 | 583 844 | + 2,603 |
| Metropolitan District.. | ,, 30 | 11,083 | 10.841 | 35 | 453,397 | + 17,926 |


# DICK, KERR & CO.,

**Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**


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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Aug. 27 | £1,698 | £1,922 | + £224 | 13 | £22,511 | + £1,556 |
| Ayr Corporation ..... | ,, 31 | 405 | 505 | + 100 | 15 | 7,847 | + 793 |
| Bath Electric ..... | ,, 27 | 1,116 | 1,338 | + 222 | 35 | 33,962 | + 2,477 |
| Birkenhead Corp. ..... | ,, 31 | 1,332 | 1,370 | + 39 | 22 | 28,710 | + 2,830 |
| Birmingham Corp. ..... | ,, 30 | 10,649 | 11,562 | + 913 | 22 | 250,117 | + 17,850 |
| Blackburn Corporation | ,, 27 | 1,125 | 1,278 | + 153 | 22 | 29,386 | + 2,570 |
| Blackpool & Fleetwood | ,, 30 | 1,431 | 1,981 | + 550 | 9 | 17,706 | + 2,650 |
| Blackpool Corporation | ,, 28 | 2,587 | 3,494 | + 907 | 21 | 50,707 | + 6,785 |
| Bolton Corporation ..... | ,, 31 | 2,671 | 2,778 | + 207 | 22 | 60,374 | + 2,973 |
| Bournemouth Corp..... | Sept. 3 | 2 589 | 2 846 | + 257 | 22 | 51,347 | + 5,862 |
| Bradford Corporation.. | Aug. 30 | 5 327 | 6,017 | + 690 | 23 | 132,221 | + 7,841 |
| Brighton Corporation.. | ,, 31 | 1,279 | 1,485 | + 206 | 22 | 26,672 | + 1,388 |
| Bristol ..... | ,, 29 | 7,721 | 8,921 | + 1,200 | 34 | 277,649 | + 38,837 |
| British Elec. Traction – | | | | | | | |
| Airdrie..... | Aug 23 | 320 | 402 | + 82 | 34 | 11,517 | + 1,677 |
| Barnsley ..... | ,, 22 | 256 | 404 | + 148 | 34 | 9,428 | + 3,534 |
| Barrow..... | ,, 22 | 458 | 506 | + 48 | 34 | 13,944 | + 952 |
| Birmg. & Mid. Joint – | | | | | | | |
| Birmingham Dist. .. | Aug. 23 | 958 | 975 | + 17 | 34 | 24,122 | + 1,486 |
| Dudley – Stourbridge | ,, 22 | 940 | 1,063 | + 83 | 34 | 34,672 | + 2,732 |
| South Staffordshire.. | ,, 22 | 988 | 1,020 | + 32 | 34 | 31,749 | + 2,294 |
| Wolverhampton Dist | ,, 22 | 513 | 557 | + 44 | 34 | 17,555 | + 1,319 |
| Devonport ..... | ,, 22 | 519 | 668 | + 149 | 34 | 18,729 | + 570 |
| Gateshead ..... | ,, 23 | 1,113 | 1,603 | + 490 | 34 | 42 895 | + 8,243 |
| Gravesend & N'thfleet | ,, 22 | 246 | 360 | + 124 | 34 | 8 018 | + 1,035 |
| Greenock—P.Gl'sgow | ,, 22 | 837 | 1,167 | + 280 | 34 | 29,837 | + 2,797 |
| Jarrow ..... | ,, 22 | 164 | 188 | + 24 | 34 | 5,009 | + 346 |
| Kidderminster ..... | ,, 22 | 139 | 156 | + 26 | 34 | 4,329 | + 210 |
| Merthyr ..... | ,, 22 | 210 | 233 | + 23 | 34 | 7,527 | + 862 |
| Metropolitan ..... | ,, 23 | 8.519 | 9,229 | + 719 | 34 | 315,189 | + 8,015 |
| Middleton ..... | ,, 22 | 390 | 464 | + 74 | 34 | 13,147 | + 791 |
| Oldham—Ashton..... | ,, 22 | 647 | 721 | + 74 | 34 | 21,093 | + 522 |
| Peterborough ..... | ,, 22 | 156 | 261 | + 105 | 34 | 6,039 | + 1,413 |
| Potteries ..... | ,, 22 | 1,912 | 1,982 | + 70 | 34 | 70,402 | + 7 533 |
| Rothesay ..... | ,, 22 | 497 | 742 | + 245 | 34 | 9,122 | + 902 |
| Sheerness ..... | ,, 23 | 68 | 77 | + 9 | 34 | 1,840 | + 132 |
| South Metropolitan.. | ,, 22 | 867 | 936 | + 69 | 34 | 28,585 | – 297 |
| Southport ..... | ,, 22 | 372 | 461 | + 89 | 34 | 11,085 | + 853 |
| Swansea ..... | ,, 23 | 1,260 | 1,371 | + 111 | 34 | 42 820 | + 4,129 |
| Taunton ..... | ,, 22 | 55 | 61 | + 6 | 34 | 1,646 | + 121 |
| Tynemouth..... | ,, 22 | 459 | 518 | + 79 | 34 | 9,552 | + 1,001 |
| Weston-super-Mare .. | ,, 23 | 367 | 553 | + 186 | 34 | 6,234 | + 1,183 |
| Worcester ..... | ,, 22 | 358 | 446 | + 88 | 34 | 10,838 | + 955 |
| Wrexham & District.. | ,, 22 | 122 | 142 | + 20 | 34 | 4,172 | + 497 |
| Yorks (Woollen) Dist. | ,, 22 | 1,147 | 1,175 | + 28 | 34 | 39,072 | + 2,822 |
| Burnley Corporation .. | ,, 30 | 1,338 | 1,661 | + 123 | 22 | 37,843 | + 4,891 |
| Burton-on-Trent Corp. | ,, 31 | 296 | 311 | + 15 | 22 | 6,476 | + 208 |
| Bury Corporation..... | ,, 31 | 1 390 | 1,410 | + 90 | 22 | 30,246 | + 1,004 |
| Cardiff Corporation.... | ,, 9 | 2,972 | 3,530 | + 558 | 19 | 52,289 | + 5,631 |
| Chatham and District.. | ,, 28 | 949 | 1,099 | + 150 | 34 | 31,527 | + 1,650 |
| Chesterfield Corp. ..... | ,, 28 | 228 | 265 | + 37 | 21 | 5,642 | + 717 |
| Colne & Trawden..... | ,, 30 | 273 | 300 | + 27 | 35 | 9,537 | + 638 |
| Cork Electric..... | ,, 23 | 498 | 530 | + 32 | 34 | 17,136 | + 211 |
| Croydon Corporation .. | ,, 22 | 1,712 | 1,693 | – 19 | 20 | 34,993 | – 4,230 |
| Darlington Corporation | ,, 30 | 233 | 267 | + 34 | 22 | 5 516 | + 529 |
| Derby Corporation ..... | ,, 30 | 933 | 1,070 | + 137 | 22 | 21,908 | + 2,358 |
| Dover Corporation .... | ,, 30 | 321 | 418 | + 95 | 22 | 5,906 | – 22 |
| Dublin & Lucan ..... | ,, 29 | 162 | 164 | + 4 | 8½ | 1,653 | + 205 |
| Dublin United ..... | ,, 29 | 6 9:8 | 5,382 | – 1,556 | 34 | 207,883 | + 5,437 |
| Dundee City ..... | ,, 27 | 1,255 | 1,382 | + 127 | 15 | 19,983 | + 1,730 |
| East Ham Corporation | ,, 30 | 970 | 1,121 | – 151 | 22 | 22 482 | – 992 |
| Exeter Corporation ... | ,, 29 | 385 | 413 | + 27 | 22 | 7,869 | + 315 |
| Gearless Mo'or 'Buses. | ,, 30 | ... | 605 | ... | 21 | 9,671 | ... |
| Glasgow Corporation .. | ,, 30 | 19,197 | 20,269 | – 1,072 | 13 | 256,290 | + 18,758 |
| Glossop(U.Elec.Supply) | ,, 30 | 130 | 135 | + 5 | 35 | 4,512 | + 539 |
| Halifax Corporation .. | ,, 28 | 1,901 | 2,217 | + 316 | 21 | 46,588 | + 731 |
| Hastings & District.... | ,, 28 | 1,436 | 1,804 | + 368 | 35 | 36,381 | + 2,667 |
| Huddersfield Corp..... | ,, 30 | 1,935 | 2,111 | + 176 | 22 | 47,338 | + 3,018 |
| Hull Corporation ..... | ,, 30 | 8,007 | 3,025 | + 18 | 23 | 66,970 | + 3,908 |
| Ilford U.D.C. ..... | ,, 30 | 463 | 449 | – 14 | 23 | 10,131 | – 1,518 |
| Ilkeston Corporation ... | Sept. 3 | 126 | 139 | + 13 | 23 | 3,040 | + 553 |
| Ipswich Corporation ... | Aug. 30 | 537 | 607 | + 70 | 20 | 10,720 | + 223 |
| Isle of Thanet |..... | ,, 30 | 1,745 | 1,988 | + 243 | 43 | 31,470 | + 1,524 |
| Kilmarnock Corp. ..... | ,, 30 | 165 | 203 | + 40 | 15 | 2 846 | + 219 |
| Lanarkshire ..... | ,, 24 | 1 631 | 1,800 | + 164 | 34 | 56,935 | + 7,200 |
| Lancashire United ..... | ,, 27 | 1,399 | 1,570 | + 171 | 34 | 51,792 | + 5,434 |
| Leeds City ..... | ,, 30 | 7,592 | 8,285 | + 693 | 22 | 184,217 | + 12,216 |
| Leicester Corporation... | ,, 30 | 2,699 | 2,876 | + 177 | 35 | 97,175 | + 8,903 |
| Leith Corporation ..... | ,, 30 | 718 | 737 | + 19 | 15 | 11,467 | + 231 |
| Liverpool Corporation.. | ,, 30 | 12,003 | 13,102 | + 1,099 | 34½ | 448,821 | + 33,075 |
| Llandudno & Colwyn B. | ,, 29 | 646 | 768 | + 82 | 39 | 13,550 | + 1 195 |
| London County Council | ,, 27 | 40,131 | 40,289 | + 158 | 21 | 894,520 | – 21,036 |
| London Gnl. Omnibus.. | ,, 30 | 55,941 | 62 347 | + 6,406 | 35 | 2,174,983 | + 454 450 |
| London United ..... | ,, 29 | 6,445 | 7,045 | + 600 | 35 | 220,611 | + 1,458 |
| Lowestoft Corporation | ,, 30 | 452 | 517 | + 65 | 47 | 10,006 | + 347 |
| Maidstone Corporation | ,, 14 | 205 | 212 | + 7 | 21 | 4,147 | + 204 |
| Manchester Corp..... | ,, 30 | 16.402 | 17,214 | + 812 | 22 | 388,764 | + 18,926 |
| Nelson Corporation..... | ,, 30 | 197 | 237 | + 40 | 22 | 4,757 | + 313 |
| N'castle-on-Tyne Corp. | ,, 30 | 4,208 | 4,818 | + 610 | 22 | 105,379 | + 9,056 |
| Newport (Mon.) Corp. . | ,, 30 | 734 | 829 | + 95 | 22 | 16,788 | + 1,154 |
| New St. Helens & Dist . | ,, 27 | 780 | 818 | + 38 | 9 | 8,111 | + 1,040 |
| Northampton Corp ..... | ,, 29 | 550 | 595 | + 45 | 21½ | 12,807 | + 493 |
| Nottingham Corp. ..... | ,, 28 | 3,254 | 3,296 | + 42 | 21½ | 71,870 | + 2,357 |
| Oldham Corporation .. | ,, 31 | 1,982 | 2 503 | + 219 | 21 | 50,961 | + 2,992 |
| Portsmouth Corp..... | ,, 31 | 2,595 | 2 968 | + 373 | 22 | 53,723 | + 2,121 |
| Preston Corporation .. | ,, 27 | 804 | 852 | + 48 | 22 | 19 530 | + 975 |
| Provincial ..... | ,, 30 | 2,279 | 2,654 | + 375 | 48 | 91,040 | + 6,139 |
| Reading Corporation .. | ,, 28 | 684 | 743 | + 59 | 21 | 15 133 | + 834 |
| Rochdale Corporation | ,, 30 | 1,581 | 1,691 | + 107 | 22 | 35,854 | + 1 151 |
| Rotherham Corp. ..... | Sept. 3 | 770 | 1,016 | + 245 | 22 | 21,076 | + 5,539 |
| Salford Corporation .. | ,, 1 | 4 933 | 5,218 | + 285 | 22 | 116 081 | + 4 002 |
| Sheffield Corporation.. | Aug. 31 | 6,697 | 7,192 | + 495 | 23 | 166,189 | + 15,254 |
| Southampton Corp. .. | ,, 27 | 1,423 | 1 516 | + 93 | 21 | 29,137 | + 1,171 |
| Southend-on-Sea Corp | ,, 27 | 1,178 | 1,673 | + 495 | 22 | 23,047 | + 3,298 |
| South Shields Corp..... | ,, 30 | 669 | 829 | + 160 | 22 | 16,862 | + 2,257 |
| Sunderland Corp. ..... | ,, 31 | 1.403 | 1 586 | + 181 | 22 | 32,819 | + 3,615 |
| Sunderland District ... | ,, 27 | 485 | 623 | + 138 | 43 | 24,622 | + 4,378 |
| Swindon Corporation'.. | ,, 27 | 179 | 192 | + 13 | 21 | 3,614 | + 268 |
| Trys. (M.E.T.) Omn. Co. | ,, 30 | ... | 8,613 | ... | 31 | 127,009 | ... |
| Tyneside Trys. & Tmrds | ,, 27 | 481 | 595 | + 114 | 9 | 4,924 | + 431 |
| Wallasey Corporation | ,, 30 | 1,375 | 1,373 | + 98 | 22 | 28,348 | + 2,454 |
| Walsall Corporation ... | ,, 30 | 599 | 688 | + 89 | 35 | 21,634 | + 1,502 |
| Walthamstow U.D.C.... | ,, 31 | 730 | 799 | + 69 | 22 | 16,921 | – 321 |
| Warrington Corp ..... | ,, 23 | 431 | 428 | – 3 | 21 | 9,649 | + 331 |
| West Ham Corporation | ,, 23 | 2,625 | 2 691 | + 66 | 21 | 59,250 | + 1.449 |
| Wigan Corporation..... | ,, 23 | 1,333 | 1,460 | + 127 | 21½ | 31,781 | + 3,361 |
| Wolverhampton Corp | Sept. 3 | 1,018 | 1,101 | + 83 | 23 | 24,697 | + 1,369 |
| Yorkshire (W. Riding | Aug. 31 | 1,353 | 1,508 | + 116 | 23 | 50,683 | + 5,645 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, September 5. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | – ⅜ | 74 – 77 xd |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¼ – 4⅝ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅜ – 4¾ |
| 100 | Do. 4% Deb. Stk. Red..... | + ⅛ | 92 – 94 |
| 100 | Do. 4½% Deb. Stk. Red..... | + ⅛ | 96 – 98 |
| 100 | Do. 5% Deb. Stk. Red.... ..... | + ⅛ | 98 –100 |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 –102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅞ – 1 |
| 1 | Do. 5% Cum. Pref ..... | ... | ⅞ – 1 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 73 – 77 |
| 1 0 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 – 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13¼ – 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ – 11¼ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 – 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | – ¼ | 95¼ – 96¼ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 7 – 7¼ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ – 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 98 –101 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5½ – 5¾ |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¾ – 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 –102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 – 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stk. | ... | 126 –129 |
| 100 | Do. Pref. Ord. Stock ..... | ... | 112 –115 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 103 –105 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 –103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 –102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | – ½ | 95 – 97 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 84 – 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... ..... | + 1 | 47 – 50 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | + ½ | 11 – 12¼ |
| ... | Do. Deferred Ord. Stock ..... | ... | 4½ – 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | ... | 91 – 94 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 75 – 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 87 – 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | + 1 | 97½ – 99¼ |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ – 6¼ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4¾ – 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 – 99 |
| 1 | Cape Electric Tramways, Ld.. ..... | ... | ⅞ – 1 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim | ... | 3 – 3¼ |
| 100 | Do. 5% Debs.. Red. ..... | ... | 87½ – 90¼ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5⅛ – 5⅜ |
| 100 | Do. 4% Debenture Stock Red, 1935 ..... | ... | 92 – 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 90½ – 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ – 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | – 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | + 3/16 | – 10⅛ |
| 10 | Do. do. 6% Pref. ..... | ... | – 13 |
| 100 | Do. do. "A" Red. ..... | ... | – 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | – 79¼ |
| 10 | Gateshead & Dist. Trys. Co., Ord. ..... | ... | 8½ – 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | ⅞ – 1 |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | 1⅜ – 1⅝ |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 – 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ... ..... | ... | 91½ – 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 – 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3¼ – 4¼ |
| 10 | Do. do. 6% Cum. Pref. ..... | ... | 6¼ – 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 – 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2½ – 2¾ |
| 100 | Do. 4% Debenture Stock ..... ..... | ... | 73 – 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 5/16 – 5/32 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 – 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 – 35 |
| 1 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. ..... | ... | 1⅛ – 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¼ – 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 76 – 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. ..... | ... | 1 3/32 – 1 1/16 |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 – 1⅛ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 – 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ⅛ – ⅜ |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | – ½ | 96½ – 98½ |
| 100 | Do. Do 5% Cum. Inc. Deb. Stk. Red. | ... | 87 – 89 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | + 1 | 61 – 65 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 –103 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¼ – 5⅛ |
| 100 | Manson Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 – 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 111 –114 |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 – 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 32/32 – 1 1/32 xd |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. .. | ... | 84 – 88 |
| 100 | Do. 5% Deb. Stock, Red. .. | ... | 90 – 93 |
| $100 | Mexico Tramways Co., Common Stock ..... | ... | 99 –101 |
| $100 | Do. Gen. Con. 1st Mort. Gld. Bonds | – 1½ | 89½ – 91½ xd |
| $500 | Do. 6% 50-yr. Mort. Bonds ..... | + 2½ | 93½ – 95½ |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | + ½ | 93 – 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 – 99 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 98 –100 |
| 1 | National Steam Car Co. Ltd ..... | – 1/32 | 1 – 1⅛ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6¼ – 6¾ xd |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5⅞ – 6¼ ,, |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6 – 6¼ ,, |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ – 5⅛ ,, |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord. ..... | ... | 1⅛ – 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 3/32 – 1/8 |
| 1 | Do. 5% Cum Pref. ..... | – 1/32 | 7/32 – 1/4 |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 – 85 |
| 1 | Provincial Tramways, Lim., Ord. ..... ..... | ... | 3¼ – 3⅝ |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ –100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% .. | ... | 54 – 57 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. .... | ... | 5 – 5¼ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 – 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 – 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | – |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | ... | 101¼ –102½ |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... ..... | ... | 95½ – 96½ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | – |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | ... | 103 –104 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8¼ – 9¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 – 89 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅝ – ¾ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 68 – 72 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 93 – 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | – 1 | 97 – 99 xd |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 86½ – 88½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83½ – 92½ |
| 5 | United Elec. Tramways of Monte Video, Ord. ..... | ... | 4½ – 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4⅜ – 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 –100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 101 –103 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅛ – ⅜ |
| 5 | Do. do. 6% Cum. Pref. ..... | – ⅛ | 3⅜ – 3⅝ |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. ..... | ... | 81 – 85 |

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

ESTABLISHED 1892. LONDON, SEPTEMBER 11, 1913. VOL. XXXIV.

# THE TRAMWAY SYSTEM OF SHEFFIELD.

The Annual Conference of the Municipal Tramways Association is this year to be held in Sheffield, a most appropriate place for the gathering of representatives of an industry which is so much dependent on steel. Before the end of the present month the Conference will have run its course, and its members will have dispersed to their homes wiser from the papers and the discussions and from the opportunities of seeing the processes of steel manufacture. They will also be wiser from their examination of the highly efficient tramway system of the city, which is conducted with so much success in conditions which present more than average difficulties. The financial success of the undertaking is also of special interest from the fact that Sheffield is the largest city which has adopted the fare of a penny all the way within the city boundary, and found it a striking success. It has been our custom in past years to present to readers of this journal shortly before each Annual Conference a description of the tramway system of the city or town in which the Conference is about to be held, and the description has included not only the engineering data but also particulars as to maintenance work, traffic arrangements, the financial results of the undertaking, and so forth. Following out the same useful practice, we are now enabled to publish the following article, which it is hoped may both assist the members of the Conference and also interest tramway men generally.

The centre of the steel industry was created a city in 1893, and the title of Lord Mayor was conferred on the then and all subsequent Mayors in 1897. The population of the city is now in round figures half a million, the rateable value is £2,000,000, the municipal debt £9,500,000, and the area 24,347 acres.

Fitzalan Square, Sheffield; Tramway Shelter on Left.

## HISTORICAL.

The Sheffield tramways were first constructed under the Sheffield Tramways Act which was passed in July, 1872, and the original length was about nine miles of double line divided into five sections. This Act was promoted by a company, prominent members of which were Daniel Busby and William Turton. A clause was inserted in the Act to the effect that the Corporation might, within a period of two months after the passing of the Act, elect to be substituted in the place

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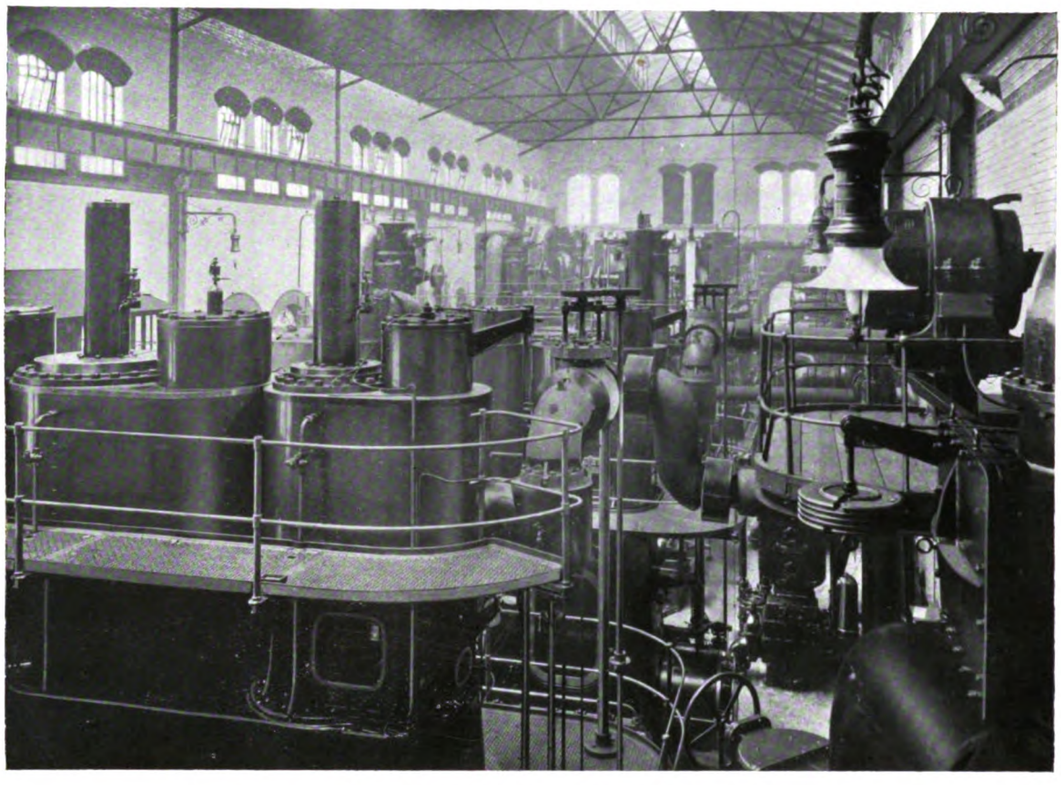
of the company for the purposes of the Act. A further clause gave the Corporation power to lease the tramways to a company.



General View of Engine Room.

Power-Station Switchboard, Showing Generator and Feeder Panels.

After the passing of the Act the Corporation, by special resolution, decided to substitute themselves in place of the company. They constructed the tramways and leased them to the company, the Corporation thus becoming one of the first municipalities to own their tramways.

The first section was opened for work in October, 1873, and the lines were leased to the Sheffield Tramway Company for a term expiring on July 10, 1896.

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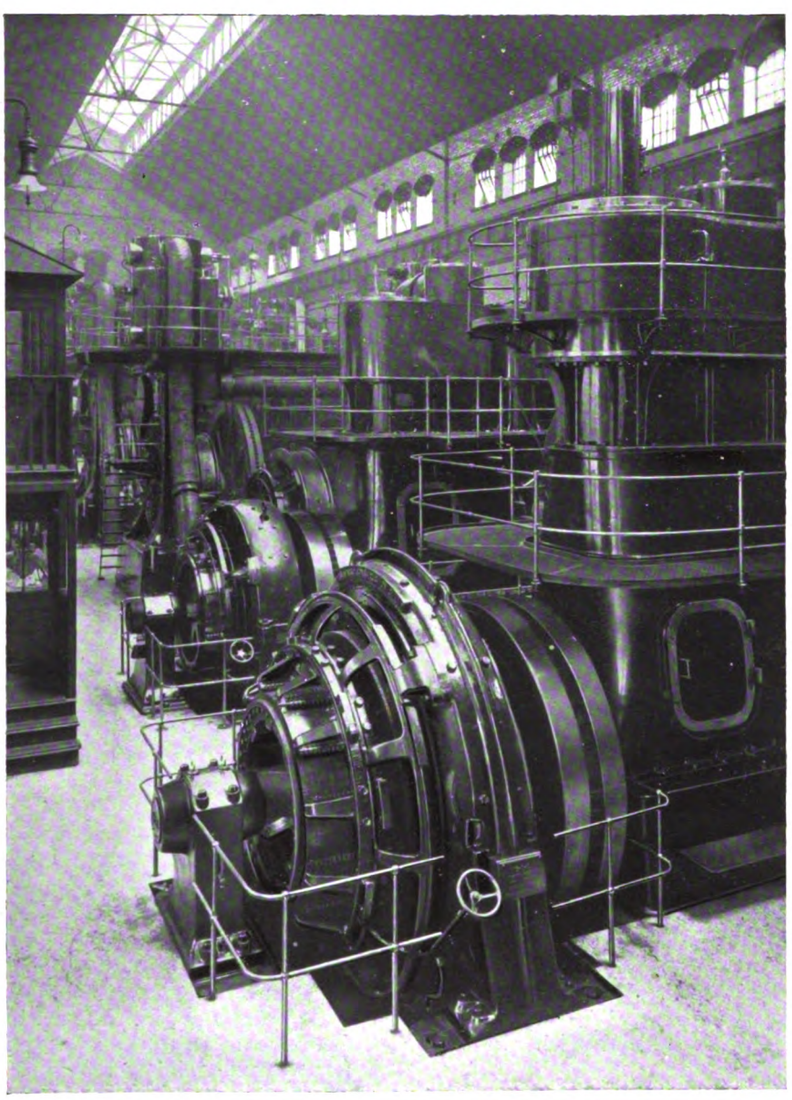
The company kept the track in repair, paid a rental of £100 per mile of route per annum, and fulfilled other conditions. These routes continued to be worked by horse traction by the Sheffield Tramway Company up to the expiration of the lease, when the Corporation commenced to work them as a municipal undertaking from July 11, 1896.

The Corporation paid the sum of £27,500 for the various properties which they took over from the company, electrified the existing tramway routes, and commenced electric traction on September 5, 1899. Since that date other routes and extensions have been constructed under various Acts of Parliament which have been obtained from time to time by the Corporation, and at the present time the Sheffield tramway system has open for traffic over 40 route miles.

In the Parliamentary session of 1912, the Corporation promoted a bill which gave powers for the construction of further six miles of tramway extensions, some of which are now under construction. The same Act also authorised the provision and working of trackless trolley vehicles, but so far it has not been suggested that this type of vehicle should be put into operation. Before leaving the historical part of the subject, it should be noted that penny fares were introduced in October, 1902, and that horse traction was finally abolished in the following month.



Main Engines and Generators

#### POWER-STATION.

Sheffield is one of those towns, comparatively few in number, which have a tramway power-station independent of those for supplying energy for lighting and miscellaneous power purposes, but work is now in hand for connecting the tramway generating station with the electric supply station at Neepsend, from which it is intended to take part of the energy required for the tramways. The tramway station is situated at Kelham Island, which is a point approximately as near to the centre of the tramway system as could be obtained. In addition to its central position the station has also the advantage of a supply of water for condensing purposes. The site is of a peculiar shape and the buildings, which are of brick, had to be designed to suit it.

Though erected 14 years ago the principle of induced draught was adopted, so that the boiler house chimneys, which are of steel, are only 80 ft. high. The boiler house contains 13 boilers, four of which are of the marine wet-back type and nine are of the water-tube make. They vary in evaporative capacity from 9,000 lb. of water per hour to 32,000 lb., the total being over 184,000 lb. All the Stirling boilers are fitted with chain-grate stokers, and the marine type boilers, which are supplied by John Brown and Company and Davy Brothers, are fitted with Bennis stokers. They all work on the induced-draught system, and the fans for the purpose are motor-driven. The boiler superheaters are of the Stirling make.

The complete coal and ash conveying plant on the push-plate principle, capable of dealing with 50 tons of coal and 5 tons of ashes per hour, was erected by Walton and Clough, together with a reinforced concrete coal bunker of about 850 tons capacity.

The coal is delivered to the boiler house by carts, and consists of washed nuts, the average price of which at present is about 13s. 4d. per ton. The feed-water pumps are of Weir and Hall make. The steam is conveyed from the boilers by one main header, the piping having been supplied by Aiton and Company and Spencer. The condensing plant consists of three Wheeler condensers (one of 1,900 sq. ft. and two of 3,400 sq. ft.), one Allen condenser of 3,000 sq. ft., and one British Westinghouse condenser of 5,000 sq. ft. cooling surface. The feed-water heater employed was also supplied by the Wheeler Condenser Company. The make-up water for the boilers is obtained from the town supply, while the circulating water for the condensers comes from the river.

The engine room started originally with three 300 H.P. engines, but it has been extended until now the following seven units are installed:

One Browett and Lindley vertical triple expansion engine of 2,000 H.P., coupled to a 1,500-KW. Electric Construction Company's generator.

One Browett and Lindley vertical triple expansion engine of 1,450 H.P., coupled to a 1,000-KW. Vickers' generator.

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Two Cole, Marchent, and Morley vertical cross-compound engines of 1,450 H.P. each, coupled to 1,000-KW. British Thomson-Houston generators.

Two Cole, Marchent, and Morley vertical cross-compound engines of 750 H.P. each, coupled to 500-KW. British Thomson-Houston generators.

One of the original 300-H.P. Allis horizontal engines, coupled to a 225-KW. British Thomson-Houston generator.

The present total horse-power is 8,150, and the total capacity of the generators 5,725 KW. The steam pressure employed is 165 lb. per sq. in., and the consumption is about 13 lb. per indicated horse-power-hour. The engine room is spanned by a crane of 25 tons capacity. All the generators are of the multipolar direct-current type, compound wound, and produce current at a pressure of from 580 to 600 volts. The combined efficiency of engines and generators is from 86 to 87 per cent.

A negative booster of 45 KW. capacity, supplied by Ernest Scott and Mountain, was installed in 1903, and two of 45 KW. each have been installed by the Electric Construction Company this year. All switchboards have marble panels, and are fitted with the usual instruments.

In connection with the supply of energy to be taken by the tramways department from the electric supply station at Neepsend, two 1,500-KW. rotary converters, with transformers, switch gear, etc., are now being constructed, and will be housed in a new building adjoining the tramway power-station. The in-coming cables will supply current at 11,200 volts, and this will be transformed and converted to 600-volt direct-current supplied to the main station bus-bars.

Two electrical oil-eliminating plants are installed, both manufactured by Davis Perrett Ltd., with a combined capacity of 15,000 gallons per hour. Owing to trouble with leaves and debris in the circulating water supply from the Kelham Goit or mill race, the Corporation have recently installed a patent drum type rotary water strainer of 500,000 gallons per hour capacity. In view of the narrow width and depth of roadway to the Kelham power-station and the very limited space for cable ducts required for extensions, the Corporation in 1903 obtained power to construct a tunnel under the Kelham Goit. The tunnel is built of cast iron segments bolted together and embedded in concrete which is 1 ft. in thickness at the top and sides and 2 ft. 6 in. thick under the tunnel. Its length is 110 ft., inside width 5 ft., and the maximum headway 7 ft. 4 in. The cast-iron top of the tunnel is 3 ft. below the bed of the Goit.

### FEEDER SYSTEM.

The general arrangement of the feeder system is that of main feeders with graded distributors. The total number of feeder cables is 25, and they are of an average sectional area of ·75 sq. in. The cables, which have principally been supplied by Glover and Company, are paper insulated, laid in earthenware and fibre ducts. The feeder points are spaced every half-mile along the routes, and the cables are divided into sections, varying from 1 sq. in. to ·3 sq. in. The distance from the power-station to the nearest feeding point or track is 1,000 yards. The average and maximum drop on the feeders are respectively 3 volts and 5 volts. The insulated return feeders vary from 1 sq. in. to ·6 sq. in. in section.

A complete private system of telephones is installed, connecting the head office, the power station, car sheds and all feeder pillars by underground wires.

Fitzalan Square Terminus.

### PERMANENT WAY.

The total route length of the tramway system is 40 miles 1 furlong 150 yards, exclusive of tracks in car sheds and those forming shed approaches. Out of this, 37 miles 5 furlongs 53 yards is double track, and 2 miles 4 furlongs 52 yards is single, giving a total length of single track of 77 miles 2 furlongs 158 yards. A notable feature of the system is that there are many gradients, both long and steep. The vehicular traffic along the streets is exceptionally heavy, not only as to

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the number of vehicles, but also as regards the weight of the loads. There are only one or two level crossings over railways, but there are a great many overhead railway bridges. The height of some of these above the street surface is only about 14 ft., so that on these routes only single-deck cars can be used. Single-deck cars are also employed on routes which include some of the steepest gradients. The maximum gradient on the whole system is in Nether Green Road, where for a distance of 100 ft. there is a slope of 1 in 9·3. Curves are fairly numerous, and the radius of the sharpest is 35 ft. The narrowest width of street in which the tramways are laid is 28 ft. 9 in., in South Road. The streets over all are not conspicuous for width, so that the total length of streets where the near rail is less than 9 ft. 6 in. from the footpath kerb is about 22 miles.

The tracks are of standard gauge and the rail employed is a modified B.S.S., No. 5, with the standard head, a thick web, and a 6-in. flange. The weight is 120 lb. per yard, and the rails are in lengths of 60 ft. The detail dimensions are: Depth, 7 in.; width of base 6 in.; width of head, $3\frac{31}{32}$ in.; width of groove, $1\frac{1}{8}$ in.; depth of groove, $1\frac{1}{8}$ in. The rails as now laid are of Sandberg high silicon steel, and were manufactured by Steel, Peech, and Tozer, Rotherham. The rails are drilled with bond holes $\frac{13}{16}$ in. in diameter. The fish plates, which are of acid Bessemer steel, weigh $56\frac{1}{2}$ lb. per pair, and are of British standard No. 5 type. There are six bolt holes 1 in. in diameter and rymered out for taper bolts. These bolts are driven in and fastened with lock nuts. The taper is from 1 in. in diameter to $1\frac{7}{32}$ in. in a length of $2\frac{3}{16}$ in. No sole plates are employed. The tie bars are of wrought iron, spaced 10 ft. apart, and are 2 in. broad by $\frac{3}{8}$ in. thick. They are secured by square nuts and washers on each side of the rail web. Drain rails are not employed.

The points have been made by Hadfield's Steel Foundry Company, Edgar Allen and Company, and Osborn and Company. Like the crossings, they are constructed of manganese steel, and this metal has also been used for the rails on several curves. The Thermit system of track welding has been employed on $6\frac{1}{2}$ miles of street, giving 11·4 miles of single track, and it is now standard practice in Sheffield. The approximate cost per joint has been £1 7s.

*Sub-structure.*—In laying the track the roadway is excavated and the rails laid and supported at the correct level; concrete is then filled in, there being 6 in. below the rail, and it is also carried up an inch above the flange of the rail. Intermediate anchors are attached to the rail about every five yards, and one is usually placed a foot away from the Thermit weld on the leading rail. The depth of excavation of the roadway for the concrete is 13 in., and the concrete used is of six to one composition. The paving consists of granite, wood, and patent paving. The granite setts partly consist of 4 in. cubes and partly of setts measuring 5 in. by 3 in. Where wood is employed the size of the blocks is 9 in. by 5 in. by 3 in. The setts are paved on a bedding of slag and tar, and grouted with pitch and tar. The wood pavement is laid on a concrete floating and grouted part of the way up with pitch and tar, and finished with cement grouting. Fully two miles double track have been constructed with longitudinal sleepers of creosoted red wood, 7 in. broad, $4\frac{1}{2}$ in. thick, and in 12 to 18 ft. lengths. The total cost of construction of the track per single mile has been about £7,200, and the work is carried out by the Corporation through the direct employment of labour.

*Bonding.*—Crown solid bonds are used, those for the fish joints being double, and 32 in. long, while those for the welded joints are single and 14 in. long. The

**View at Moorhead—Tramway Shelter on Right.**

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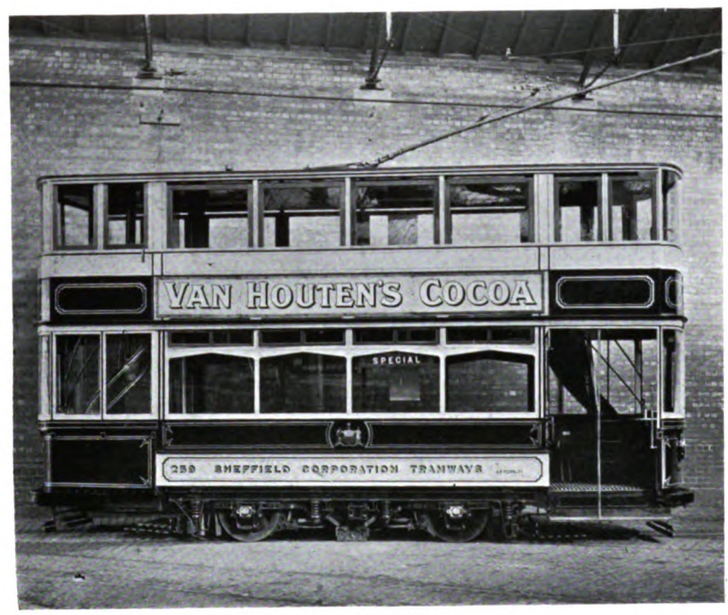
gauge is 4/0 B. and S. The sectional area of each bond is ·166 sq. in., and the conductivity is 98 per cent. of that of the rail. The cross bonds are of the same gauge, and are spaced 40 yards apart.

### OVERHEAD EQUIPMENT.

In regard to the overhead equipment, it is now principally on the span-wire system, with swivelling trolley head. The greatest out-reach laterally of the trolley arm is about 5 ft., but on the average the wire provides for practically centre running. Double wires are employed throughout of 2/0 gauge; some are of copper and others are bronze and phono-electric. The conductivity of the copper wire is of 100 per cent., and that of the bronze 51 per cent. The breaking strain is 34 tons per sq. in. As usual, the wires are divided up into half-mile sections. They have chiefly been provided by the British Insulated and Helsby Cables, and the Equipment and Engineering Company. The span wires are of 7/12, and the guard wires of 7/16. The poles, which are spaced from 90 ft. to 100 ft. apart, are of three weights, all according to the British standards for steel tube poles. The suspension is flexible, and has been made by the tramway department. The brackets are of wrought iron with cast-iron clips. In some places wall rosettes are used in-tead of poles, and these are of malleable iron with rubber silencers.




Side View of Vestibuled Car.

### ROLLING STOCK.

The number of passenger cars engaged in working the tramways at present is 287, and the total number of all classes of tramway vehicles is 303. The latter figure is made up as follows:

| | |
|---|---|
| Covered double-deck cars | 219 |
| Ordinary double-deck cars | 7 |
| Single-deck cars | 53 |
| Stores vehicles, etc. | 16 |
| Double-deck omnibuses | 5 |
| Single-deck omnibuses | 3 |
| Total | 303 |

The cars which were purchased in the early days of electric traction were fitted with two 20-H.P. motors, and the second hundred purchased were fitted with two 27-H.P. motors. Both these types of motors have since been found too slow for modern requirements, and with few exceptions the 20-H.P. and the 27-H.P. motors have been replaced with 37 or 40-H.P. motors, which are much faster and also better able to cope with the larger top-covered cars which are now used in the service.

The extended canopy cars (with

Standard Double-Deck Vestibule Car and Car of Old Type now being Converted to Standard.

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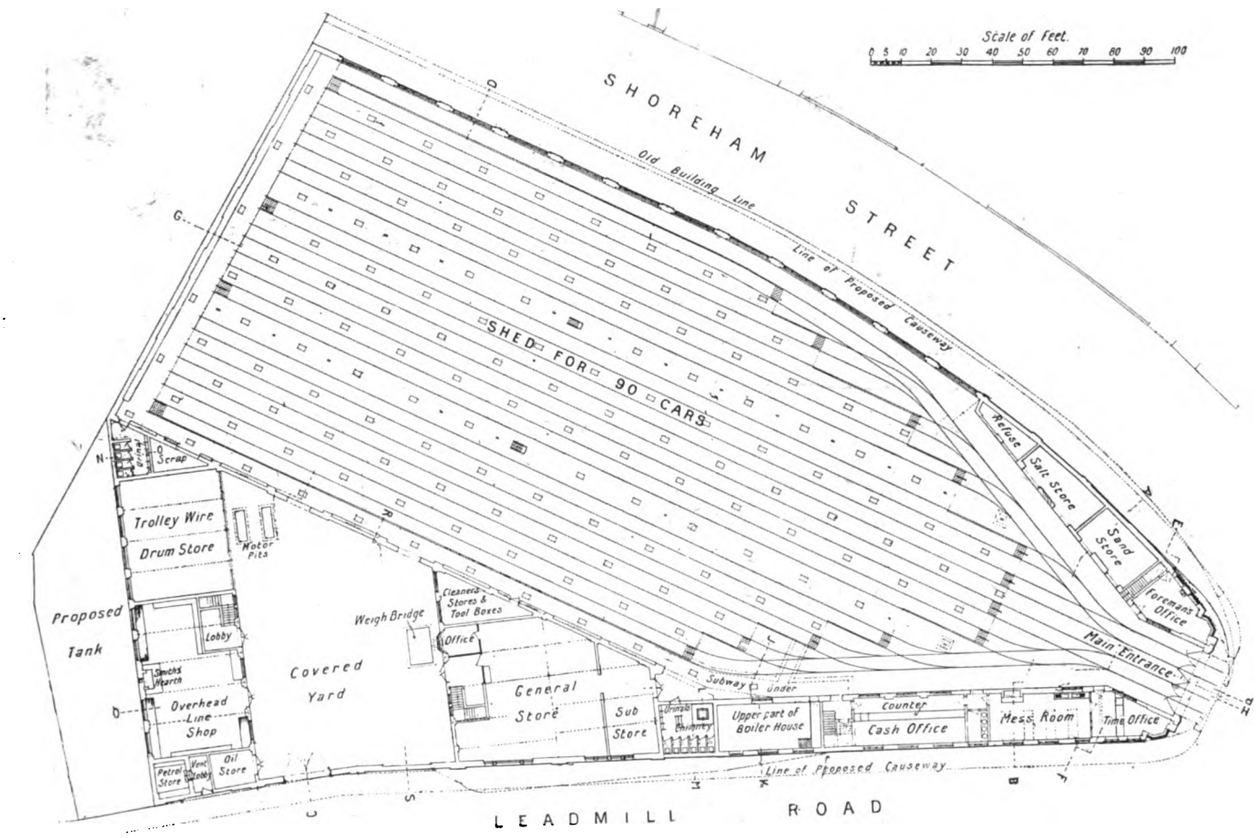
four outside seats at each end of the top deck) which are being constructed cost approximately £730 each and weigh about 11 tons.

The old type of short-ended cars with steep staircases and small platforms is gradually being converted into the more modern type of car. This is an expensive matter, but the committee put efficiency in rolling stock in the fore-front and do not hesitate to spend the necessary money in work of this description, which however will take a considerable time to complete.

During the past five years an average of 25 new tops have been constructed in the Corporation workshops each year, and all the cars have been fitted with covers. An additional 50 cars are now being constructed by the Brush Company, all with vestibule ends.

Coming to technical details of the rolling stock, the cars have been supplied by various makers, including Milnes and Company, the Brush Electrical and Engineering Company, Cravens, Limited, and the United Electric Car Company. Single trucks, some of the radial variety, are used, the makers being Milnes and Company, the Peckham Truck Company, the J. G. Brill Company, the Brush Company, Mountain and Gibson, and the British Radial Axle Cars, Limited. The weight of the double-deck cars, completely equipped, is from 10 tons to 12½ tons, and of the single-deck cars 8 tons 7 cwts. The wheel base for the radial trucks is 8 ft. 6 in., and for the rigid trucks 6 ft. 6 in. The spring base is 15 ft. The wheels have cast-steel centres, and the tyres are of acid open-hearth steel. The diameter of the wheels on flange is 32¾ in., and that of the axles 4¼ in. The axles were made by T. Firth and Sons, and the tyres by John Brown and Company and Brown Bayley's Steel Works. Some of the double-deck cars are 31 ft. 10 in. long over all, while others are 29 ft. 4 in. The single-deck cars all measure 31 ft. 4 in. All cars are 7 ft. 3 in. wide over all, 6 ft. wide at floor sills, and 6 ft. 6 in. high inside from the floor to the centre of the ceiling. The double-deck cars seat, according to the size, from 30 to 40 passengers outside and from 22 to 28 inside, giving a total of 52 and 68 respectively. The single-deck cars seat 28 passengers. All are fitted with hand-slipper, rheostatic, and mechanical track brakes, the latter having poplar wood blocks. The collision fenders are of steel, 6 in. by 3 in. by ·375 in., and the draw-bar sockets are of wrought iron. The life-guards are of the National Railway improved type, and John Taylor's and "Common Sense" forms of pedal sand boxes are used. The double-deck cars have from 20 to 25 lights each, and the single-deck 15. No oil lamps are provided.

In regard to the electrical equipment of the cars, each has two motors, and the following types are used: G.E.-52 (5-turn), G.E.-58 (4-turn), and R.G.E.-20. The G.E.-52 motor is of 27 H.P., the G.E.-58 of 37½ H.P., and the R.G.E.-20 40 H.P. All were supplied by the British Thomson-Houston Company. The same makers fitted the controllers of their B.-6 and B.-13 types. The motors are geared to the car axles by cast-steel pinions meshing into cast-steel axle gears. The trolleys are of the B.M. and R. flat base type.




**Plan of Shoreham Street Car Depot.**

#### CAR SHEDS.

There are four car sheds, namely, Tinsley and Hillsborough in the north, and Queen's Road and Shoreham Street in the south. They provide accommodation for 340 cars. The Hillsborough shed (now under reconstruction) and the Tinsley shed were the original depots used by the Sheffield Tramway Company. The former is two and the latter three miles from the centre of the city.

The latest depot built is the one at Shoreham Street, which can store 110 cars, and provides office accommodation, lavatories, mess rooms, and stores, including

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clothing stores where all the uniforms and other articles of clothing are delivered, and where a staff of tailors is constantly employed carrying out the repairs to employees' uniforms with the aid of electrically driven machines. There is also a large garage for the motor vehicles operated by the department, together with overhead line stores and workshops.

This Shoreham Street depot was opened in February, 1911, and it immediately proved a great convenience from its central situation, as other car-sheds were near the outer termini of the tramways. The Shoreham Street depot is only a short distance from Fitzalan Square, the city terminus of several tramway routes, and the principal centre of the whole system. The site comprises 6,315 square yards, and the land has been taken on a lease for 200 years. The structure, which is well built and carefully designed, cost about £27,500.

supplied with hot water for car washing and other purposes. The floor of the main shed, including the inspection pits and subways, as well as the gangways above, is constructed of reinforced concrete. The spacious mess rooms for the men have boarded floors of maple, and are provided with ranges and other convenient arrangements for the comfort of the men.

#### REPAIR SHOPS.

The car repair works and machine shops, together with the woodworking and car building shops, are situated at the Queen's Road depot, which is about two miles from the centre of the city. Two hundred men and boys are employed in these shops. It is only recently that it has been possible to centralise these shops; previously they were distributed at the various depots. The present arrangement is a vast improve-

**Interior of Shoreham Street Car Depot, Showing Arrangement of Tracks and Galleries.**

The main entrance is on a central axis with two running tracks branching out into twelve storage tracks, with an inspection pit extending clear across the tracks and making it possible for men to pass from track to track without ascending to the main floor. The work of the cleaners is expedited by the placing of galleries along both sides of each track at the level of the upper deck of the cars. These galleries are suspended from the roof, and produce no obstruction. The offices, men's mess rooms, etc., adjoin the main shed, and are situated over the entrance and in a two storey block fronting to Leadmill Road, with a boiler house and fuel storage in the basement. The remainder of the site fronting Leadmill Road, covering an area of about 1,300 square yards, contains a large covered yard for motor garage and overhead line head-quarters, and two double-storied buildings for general stores, workshops, etc. The whole of the building is heated by low-pressure steam and

ment and tends to economical and efficient supervision and working. The staff at these works is made up as follows:

*Day Staff:*

| | |
|---|---|
| Foremen, timekeepers, storekeepers, and clerks .. | 13 |
| Overhaul fitters .. .. .. .. .. .. | 12 |
| Fitters and turners .. .. .. .. .. | 24 |
| Machinists, drillers, etc. .. .. .. .. | 10 |
| Electricians and wiremen (8); armature winders (3) | 11 |
| Body makers .. .. .. .. .. .. | 27 |
| Blacksmiths, coachsmiths, strikers, tinsmith, and pattern maker .. .. .. .. .. | 14 |
| Painters and labourers .. .. .. .. .. | 6 |
| Apprentices .. .. .. .. .. .. | 21 |
| Labourers .. .. .. .. .. .. .. | 45 |
| Sundry employees .. .. .. .. .. | 13 |
| Joiners .. .. .. .. .. .. .. | 4 |
| | 200 |

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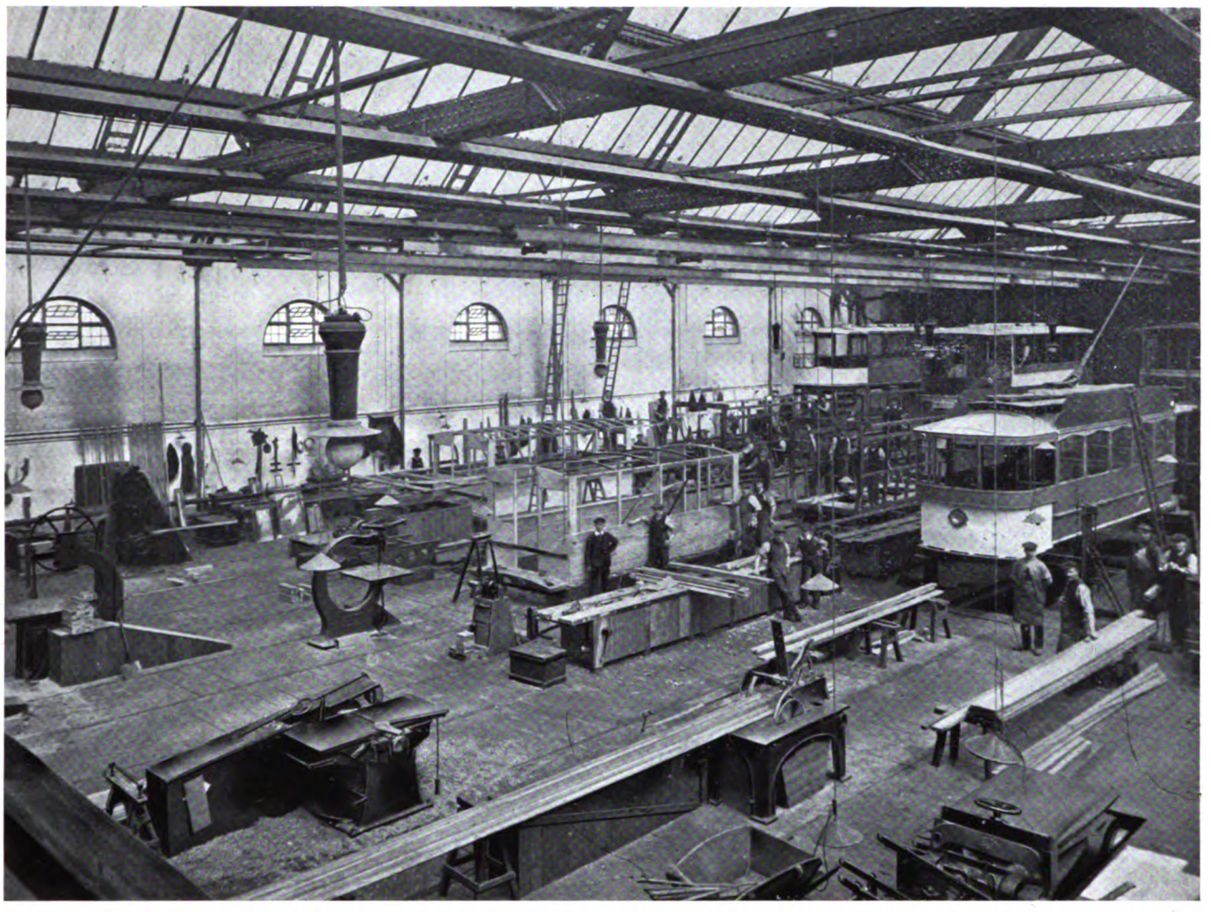

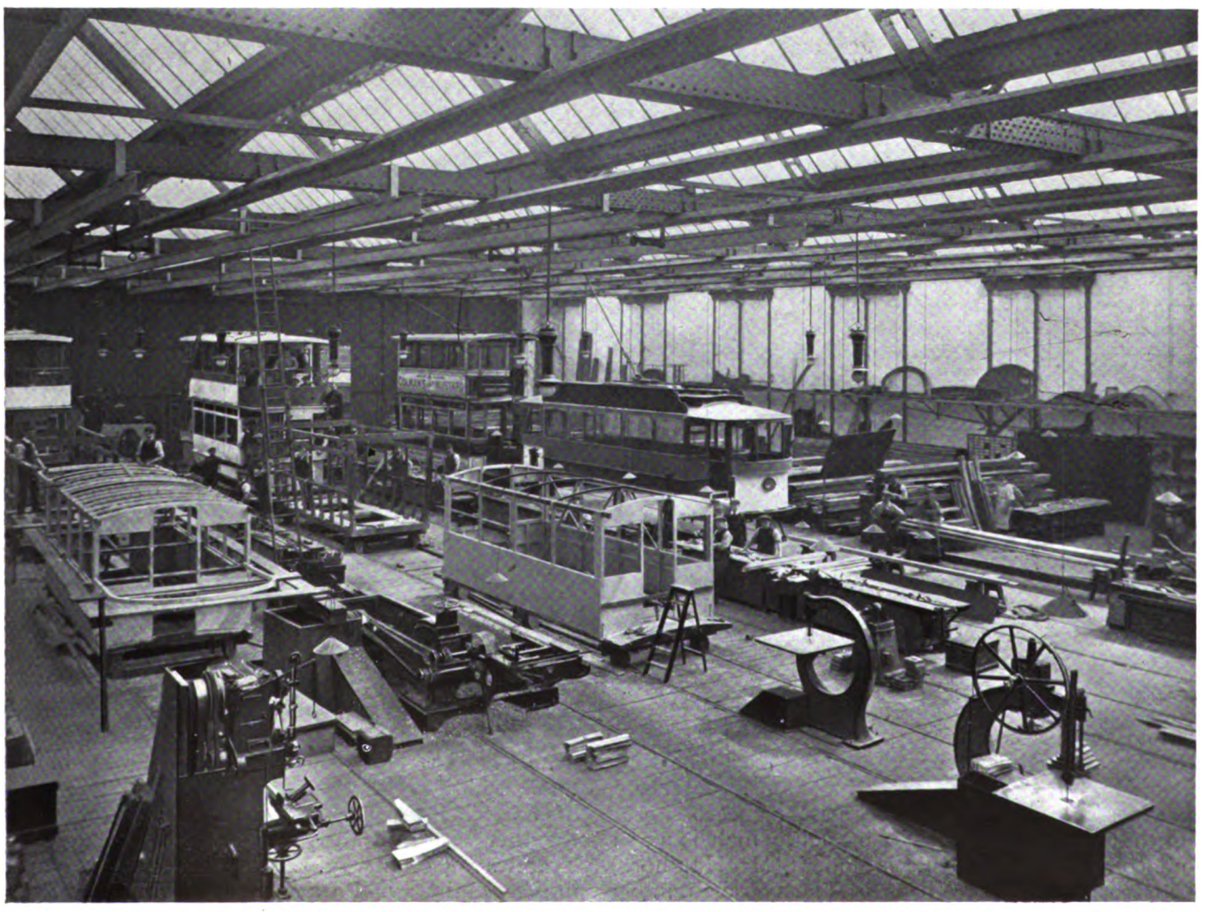

Views of Body-Makers' Shop at Queen's Road Car Works.



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### TRAFFIC ARRANGEMENTS.

The following are the scales of wages for traffic employees:

*Motormen*:
6¾d. per hour on joining.
7¼d. „ „ after six months.
7½d. „ „ after further six months.
Rates up to 8·2d. per hour are paid for certain hilly routes.
In addition, motormen are granted merit badges on completion of seven and 12 years' approved service, each badge entitling the wearer to an additional 1s. per week in wages.

*Conductor*:
5·8d. per hour on joining.
6d. „ „ after 12 months.
6¼d. „ „ on completion of 18 months' approved service.

Billiard Room at Employees' Club.

Uniform Men's Mess Room at Central Depot.

Reading Room at Employees' Club.

Tailors' Shop at Car Depot.

Merit badges are granted on completion of two, four, and seven years' approved service, each badge entitling the wearer to an additional 1s. per week in wages.

*Inspectors*:
£2 0s. per week on appointment.
£2 2s. „ „ at the end of five years' service.
£2 4s. „ „ on completion of 10 years' approved service.

Time and a quarter is the minimum rate of pay for all employees for Sunday work.

The arrangements for the running of the cars, making out time-tables, duties of motormen and conductors, timekeepers, rail and point cleaners, inspectors, etc., are in the hands of the traffic branch, which is under the control of the traffic superintendent (Mr. Handford) and his assistant (Mr. Wilson). The average number of cars working each day now approximates 211. The car working day is divided into two parts in such a way as to give two shifts of men engaged on the whole-day cars as nearly as possible an equal number of hours per day. The first car out of a depot in the morning leaves Tinsley at 4-15 a.m. for the city, and the last car arrives in at night at 1-0 a.m. The average interval between cars is five minutes, and the busiest time of the day is from 8-20 to 8-50 a.m. The fixed stopping places are about a furlong apart, and are shown by indicator plates and special painting of poles. While the maximum speed allowed for the cars is 16 miles per hour, the average speed, including stops, is 7·372 miles per hour. The general fare is a penny, but there are halfpenny stages. The longest through route is from Market Side to Firth Park, three miles 1,540 yards, and for this the fare is a penny. The average fare per mile works out at ·386d.

The employees have a club conveniently situated in the centre of the city, at which they can obtain their meals at cost price, and where there are also a reading room, billiard and bagatelle tables, etc. The men pay a subscription of 6d. per month, and in addition to receiving the benefits of the club itself there is an organised Hospital and Benevolent Fund which makes grants from time to time to members who have been off sick for a certain number of weeks and are in need of financial assistance. The rent of the premises, together with rates, etc., are paid by the club, but the Tramways Committee pay the wages of the employees in the club, amunoting to approximately £570 per annum.

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### THROUGH-RUNNING ARRANGEMENTS.

Through tramway traffic with Rotherham was commenced on September 11, 1905, and the result of coupling up the two tracks has been beneficial to both tramways. The arrangement between the two Corporations is a very simple one, and provides that all fares taken within the old city boundary of Sheffield—no matter on whose cars—are the property of the Sheffield Corporation, and all fares taken outside the old city boundary are the property of the Rotherham Corporation. The total number of through passengers carried last year was 908,432.

### LOST PROPERTY.

Lost property also entails considerable work for the traffic staff. For the twelve months ended March 25, 1913, 11,684 articles were handed in as left behind by passengers, and the detailed list of these articles is an astonishing one. For instance there were:

2,855 parcels, handbags, and baskets.
1,454 gloves and aprons.
1,072 umbrellas.
730 purses and satchels.
1,002 passengers' change and money.
405 articles of wearing apparel.

### CASH AND TICKET DEPARTMENT.

Sixteen female assistants are employed in the ticket and bell punch office, where there is an average stock of 20 million tickets. In connection with the cashiers' work, there are nine cash clerks employed every evening at the depots taking in the receipts from the conductors when they have finished duty.

The average traffic receipts in Sheffield now amount to £7,500 weekly, and it may be of interest to point out that included in this amount is 4¼ tons of copper coins (which equal about £1,700 weekly, and consist roughly of half a million pennies and half-pennies) 20,000 sixpences, 8,000 threepenny pieces, 28,000 celluloid tokens, and the remainder the usual silver coins. The copper is packed in 5s. rolls. The tramway department is considered by all the banks and large business firms in the city to be the copper exchange for Sheffield and district.

### ACCIDENTS.

A very small but necessary branch of the staff is engaged in dealing with accident reports, and with claims that arise therefrom. A strict rule in the department is to the effect that all accidents of every description, no matter how trivial, which occur to passengers, or in connection with the working of the cars, must be fully reported by the employees in charge of the cars. By far the greater majority of the accidents are entirely owing to passengers and intending passengers, particularly the ladies, persisting in entering

View of Tramway Offices.

Omnibus Garage at Central Car Depot.

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and leaving cars in motion. Recently a considerable improvement has been brought about in this direction by the system of taking a proportion of the fares of top-deck passengers on the platforms, and instructing the motormen and conductors that they are to prevent ladies leaving the cars which are in motion, as it was found that the ordinary warning was not enough, and seldom taken with sufficient seriousness.

In regard to the claims for compensation, and the amounts which are paid by the Sheffield Tramways for accidents and damage of all description, these are probably the lowest for any large tramway in Great Britain.

### THE TRAMWAY OFFICES.

The tramway offices are housed in a handsome building in Division Street, covering 7,180 sq. ft. They were originally erected by the Sheffield Waterworks Company in 1870, an undertaking now absorbed by the Corporation. The offices are situated within one minute's walk of the Town Hall, and conveniently near two tramway routes. They are well lighted and spacious, and the accommodation is ample. The general manager's and electrical engineer's private offices occupy the front rooms, facing Division Street, where there is the general entrance. Separate accommodation is provided on the ground floor for the general clerical and accountant's staff in the traffic department. There is abundant accommodation on the second floor, where the ticket department is situated. All the rooms are heated by high-pressure hot water, and lighted by electricity. For the traffic department there is a room 41 ft. long by 36 ft. wide, where inspectors, motormen, and conductors sign on for duty. Substantial provision is made for cash clerks and payment of wages.

### FINANCIAL.

In regard to financial results, the policy of the committee and Council has been one that does not tend to produce so large a profit as on a number of other systems of similar size, but notwithstanding this, whilst an annual contribution of about £30,000 is now made in relief of rates, considerable sums are annually distributed in various forms in such ways as assisting the Sheffield University, providing music, concerts, and illuminations in the parks; contribution to Rifle Association, grant to Cutlers' Company (for protection of trade name of city), grant for provision of holiday for poor children, etc. These contributions are made under clause 65 of the old Act of 1872, which states, (after making certain other provisions) "that the balance shall be applied by the Corporation in payment of any charges or expenses for the time being payable out of the borough fund or borough rates leviable by the Corporation, or otherwise for the public benefit of the inhabitants of the borough, and for the improvement of the borough."

A table showing the financial history of the undertaking is annexed. It will be seen that the total capital expenditure at the latest date was nearly a million and a half, and that over £400,000 of this has been repaid.

### MOTOR OMNIBUS SERVICES.

During the past few months, the Tramways Committee have made a new departure by instituting four services of motor omnibuses, the powers for running which they obtained under the Sheffield Corporation Act, 1907. The vehicles are all of the 40 H.P. Daimler type with silent Knight engines, and fitted with electric lighting sets, chain-driven gear boxes, and Continental tyres. The carrying capacity of the double-deck omnibuses is 36, and that of the single-deck omnibuses 27, in each case including two passengers alongside the driver.

### SHEFFIELD CORPORATION TRAMWAYS—SUMMARY OF FINANCIAL RESULTS, 1904-1913.

| Year | 1904-5 | 1905-6. | 1906-7. | 1907-8. | 1908-9. | 1909-10. | 1910-11. | 1911-12. | 1912-13. |
|---|---|---|---|---|---|---|---|---|---|
| | Mls. fur. chns. 65 6 0 | Mls. fur. chns. 65 6 0 | Mls. fur. chns. 66 2 8 | Mls. fur. chns. 68 4 7 | Mls. fur. chns. 71 3 4 | Mls. fur. chns. 75 5 1 | Mls. fur. chns. 76 3 5 | Mls. fur. chns. 76 5 8 | Mls. fur. chns. 77 6 7 |
| Lines open (single track) miles | | | | | | | | | |
| Total capital expenditure | £1,135,565 | £1,158,948 | £1,172,279 | £1,220,559 | £1,281,924 | £1,324,680 | £1,354,971 | £1,375,381 | £1,411,959 |
| Loans outstanding | £1,132,468 | £1,022,836 | £970,620 | £970,528 | £1,080,863 | £1,062,483 | £1,084,824 | £1,071,666 | £1,067,897 |
| Loans repaid and sinking funds | £138,829 | £166,992 | £192,278 | £226,205 | £258,733 | £296,757 | £336,136 | £377,065 | £418,291 |
| Renewals and reserve funds | £46,946 | £60,357 | £74,246 | £69,354 | £69,806 | £63,310 | £30,280 | £14,404 | £8,727 |
| Total receipts | £242,851 | £258,730 | £279,586 | £292,393 | £288,860 | £299,154 | £319,760 | £341,004 | £361,845 |
| Working expenses | £163,283 | £157,070 | £168,419 | £177,950 | £180,606 | £181,517 | £186,024 | £196,607 | £207,690 |
| Net surplus | £17,326 | £36,370 | £49,812 | £47,471 | £38,970 | £39,252 | £53,209 | £61,334 | £69,665 |
| Appropriation of net surplus: | | | | | | | | | |
| To reserve [3rd party insurance and renewals] | £2,000 | £26,000 | £22,118 | £22,066 | £21,454 | £21,606 | £21,396 | £25,411 | £30,186 |
| To surplus revenue, contributions to parks and music, special purposes, etc. | £2,326 | £1,370 | £2,911 | £2,873 | £2,516 | £5,453 | £5,272 | £9,034 | £9,245 |
| To relief of rates | £13,000 | £9,000 | £24,783 | £22,532 | £15,000 | £12,193 | £26,541 | £26,889 | £30,234 |
| Average total receipts per car-mile | 9·634d. | 9·957d. | 9·861d. | 9·932d. | 9,414d. | 9·624d. | 10·073d. | 10·601d. | 10·760d. |
| Percentage of operating expenses to total revenue | 67·23% | 60·708% | 60·239% | 60·86% | 62·524% | 60·676% | 58·176% | 57·655% | 57·389% |
| Energy consumption per car-mile (units) | 1·72 | 1·709 | 1·697 | 1·725 | 1,623 | 1·648 | 1·667 | 1·784 | 1·837 |
| Car-mileage | 6,049,899 | 6,236,561 | 6,804,656 | 7,065,380 | 7,364,305 | 7,459,911 | 7,618,383 | 7,720,026 | 8,071,188 |
| Passengers carried | 63,952,283 | 68,244,937 | 73,966,299 | 77,568,686 | 76,356,031 | 78,620,798 | 84,500,331 | 90,458,851 | 96,330,242 |
| Traffic revenue per mile of single track | £3,659 | £3,888 | £4,174 | £4,225 | £4,003 | £3,917 | £4,144 | £4,403 | £4,606 |
| Operating expenses per passenger | ·61d. | ·55d | ·546d. | ·55d. | ·567d. | ·554d. | ·527d. | ·522d. | ·516d. |
| Average number of cars in use daily | 163·354 | | 178·234 | 185·066 | 191·436 | 209·185 | 206·18 | 208·192 | 214·019 |
| Average working expenses per car-mile (excluding power cost) | 5·68d. | 5·306d. | 5·202d. | 5·308d. | 5·177d. | 5·183d. | 5·195d. | 5·360d. | 5·329d. |
| Average working expenses per car-mile (including power cost) | 6·98d. | 6·556d. | 6·390d. | 6·505d. | 6·325d. | 6·329d. | 6·341 | 6·606d. | 6·654d. |
| Average fare paid per passenger | ·90d. | ·901. | ·898d. | ·896d. | ·899d. | ·904d. | ·900d. | ·896d. | ·893d. |
| Total number of units used | 10,410,119 | 10,658,492 | 11,546,500 | 12,188,861 | 11,949,901 | 12,294,719 | 12,699,319 | 13,772,171 | 14,829,571 |

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**Mr. A. R. Fearnley,**
*General Manager.*

**Coun. A. T. Bescoby.**
*Vice-Chairman.*

**Ald. J. Knowles,**
*Chairman, Engineering Construction Committee.*

**Sir William Clegg.**
*Chairman.*

**Mr. A. Handford,**
*Traffic Superintendent.*

**Mr. W. J. Hadfield,**
*Surveyor of Highways.*

**Mr. H. E. Yerbury,**
*Chief Electrical Engineer.*

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The 'buses have been in service since the beginning of February, and up to the present have run about 95,000 miles and given a very satisfactory service. Further orders are being placed for additional 'buses for other routes. The gradients on which the 'buses are working are fairly steep, in one case being as much as 1 in 12 for a length of approximately 100 yards.

On Sundays an eight-minute service is maintained on one route, which branches out into the country a distance of three miles from the tramway route, and on fine days the traffic is so heavy that a five-minute service would not be too much for the number of passengers who desire to avail themselves of the opportunity of getting out into the country districts. The single-deck 'buses are used on a route where there are two low railway bridges, which prohibit the use of either double-deck tramcars or double-deck 'buses.

The Education Department have taken advantage of the provision of the 'buses by making arrangements with the Tramways Committee for the conveyance of children each morning out to the open-air school, which is situated some five miles from the centre of the city, a journey which previously had to be made partly by tramcar and partly by horse wagonette.

It is too early yet to give any reliable figures regarding working expenses, but it will be interesting to see these worked out on the standard adopted by the municipalities, and in a somewhat similar way to the standard form of tramway accounts.

**Single and Double-Deck Omnibuses.**

#### THE TRAMWAYS COMMITTEE.

The following are the members of the present Tramways Committee:

The Lord Mayor (S. Osborn, Esq., J.P.)
Chairman: Alderman Sir William E. Clegg, LL.D., J.P.
Deputy-Chairman: Councillor A. T. Bescoby, J.P.

| | |
|---|---|
| Alderman C. F. Bennett. | Councillor W. Bakewell. |
| Alderman H. Hughes, C.B., C.M.G., LL.D., J.P. | Councillor C. Barker. |
| | Councillor J. W. Crowther. |
| Alderman J. Knowles, J.P. | Councillor T. G. Evans. |
| Alderman Sir C. T. Skelton, J.P. | Councillor R. Holmshaw, J.P. |
| Alderman J. R. Wheatley, J.P. | Councillor J. Peck. |
| Councillor A. J. Bailey, J.P. | Councillor S. Walker, J.P. |

Of the present Tramways Committee the only two members who were on the original committee formed in 1896, are the chairman, Alderman Sir William Clegg (who has been chairman from the commencement) and Alderman J. R. Wheatley.

Mr. A. R. Fearnley took over the management of the tramways in December, 1903, succeeding Mr. A. L. C. Fell, who had occupied that position from the commencement, and who left Sheffield to become chief officer of the London County Council Tramways. Mr. H. E. Yerbury, M.Inst.C.E., is the chief electrical engineer.

## NOTTS. AND DERBYSHIRE TRAMWAYS.

The newly-constructed tramways undertaking of the Nottinghamshire and Derbyshire Tramways Light and Power Company was partially opened for traffic on August 7, after inspection by Lieut.-Col. Druitt, of the Board of Trade. The portion then inspected and passed was from Heanor to Cinder Hill. On August 15 the Ripley to Crosshill section was inspected by Colonel Druitt, and was subsequently opened to the public, thus completing the tramways. The system, which is to link up with the Nottingham Corporation Tramways, is 13¾ miles in length. The power-station is at Ilkeston. Messrs. Balfour, Beatty, and Company were the contractors. A good deal of road widening has been necessary, as well as some displacement of gas and water mains, while two canal bridges have had to be strengthened. The new line brings such populous districts as Codnor, Heanor, Langley Mill, Eastwood, and Kimberley into touch with Nottingham. The decoration of the cars is in pale yellow and green, picked out with gold.

Since the Nottinghamshire and Derbyshire Tramways Company was formed, the whole of their issued shares and debenture scrip have been acquired by the Tramways, Light, and Power Company, Limited, of 22a, College Hill, Cannon Street, E.C. The company have various powers for the construction of tramways in the counties of Nottingham and Derbyshire and the city of Nottingham, and running powers over certain of the Nottingham Corporation tramways. The directors of the company are the Right Hon. Viscount Chilston, Mr. A. A. Holland, and Mr. George Balfour; the secretary is Mr W. Bryden.

**Tramwaymen and the Territorial Force.**—Manchester has achieved a measure of fame in the way of its large proportion of tramwaymen who serve in the Territorial Force. A hundred men in August concluded their annual training

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## CORRESPONDENCE.

### The Rating of Tramways.

To the Editor of the Tramway and Railway World.

Sir,—Amongst the commercial undertakings brought into existence by the Legislature, there is not one which has received so much discouragement and encountered so much general antagonism as the tramway industry, but there is not one which can lay better claim to public consideration and support, because of the great benefit conferred upon the travelling public and more particularly on the working population.

The unfortunate decision of the House of Lords in the Tottenham rating case is, therefore, a matter of great interest to the public as well as to the tramway undertaker. It is of great interest to the tramway world, because for once we appear to be able to follow the grounds on which the decision was based. It must be borne in mind that it is a complete reversal of the unanimous decision of a strong Court of Appeal, and seems to be in disregard of the broad general principles to be found in the judgment of Lord MacNaghten in the previous decision of the House of Lords in the Blackpool case. Out of respect alone for the views of these eminent lawyers one would have thought that none of the Lords of Appeal in the present case would have made inaccurate statements in order to assist them to arrive at a new decision, nor have made perfectly unnecessary statements, which indicate either an insufficient knowledge or an inaccurate appreciation of legislative history.

I am desirous, by your courtesy, with all due respect, of passing a few criticisms on the judgment of Lord Moulton. The whole judgment strikes one as being more of a defence of personal views and opinions than a lucid exposition of the problem under review which the importance of the issue demanded.

Lord Moulton suggests that because the streets provide the support for tramway rails, because the pavements provide a platform for the use of passengers, and because the streets are lighted, therefore tramways are not to be treated as railways. But he omitted to mention and apparently did not appreciate that for the privilege of laying a railway in a street a large portion of the street must be maintained by the tramway undertaker, and also that more often than not considerable sums are required to be spent in making widenings and carrying out improvements in the streets which the road authority, in discharge of its duties, has not provided, but takes the opportunity of imposing upon the tramway undertaker.

Moreover, the streets are lighted alike for all classes of traffic, and a tramway probably needs less public lighting than any other form of traffic.

Incidentally in many cases the tramway undertaker is also required to light the streets for the benefit of the public at his own expense.

Lord Moulton's uncalled-for criticism of the working of the Light Railways Act is not only unfortunate, but inaccurate in the extreme, and leads one to speculate whether or not he deemed his position so hardly pressed that in enforcing his personal views he felt light railways constructed in the streets (in other words tramways) clearly showed the inconsistency of such views.

As a member of Mr. Bryce's Committee on Light Railways in 1894, on whose report the Light Railways Act was brought into existence, I was astonished when I read Lord Moulton's views on what he thought it properly included.

I should, failing other evidence, have had no hesitation in joining issue with Lord Moulton on my own knowledge of the scope of the legislation recommended by that Committee, but I prefer to stand by the Parliamentary debate when the Light Railways Act was introduced.

Earl Dudley, in introducing the bill, said that it was founded on the recommendation of a Committee which sat in 1894, *i.e.*, Mr. Bryce's Committee, of which, as I have said, I was a member. The Chairman of Committees (Lord Morley) told the House of Lords: "That the bill included not merely all tramways but any railway which the Board of Trade thought might justly be brought within its scope. *It certainly included tramways in towns* and it might include large trunk lines throughout the country." He also stated that: "It would be possible, though he did not say it was probable, that under this bill the London County Council and the Oxford County Council might make a line between Oxford and London, and *it would be possible also for a company to make a tramway through the streets of London, evading all the provisions of the Tramways Acts*, without the consent of the frontagers or the local authorities, and without the precautions which were taken under the Tramways Acts for the sale of these undertakings to the local bodies." The italics are, of course, my own.

Finally, we have the provisions of the Act itself, by which any County Council or any Borough Council is enabled to obtain powers to make a light railway in its district. How this could be done in the case of a Borough Council without going along streets perhaps Lord Moulton could tell us. How can Lord Moulton therefore say, either with any sense of accurate knowledge or legal consistency, that "by what he had no hesitation in regarding as an abuse of the Act" schemes were sanctioned under the authority of the Light Railways Act for the construction of what ought to have been regarded as tramways.

It appears to me that it is impossible to find a single argument in Lord Moulton's judgment which clearly demonstrates that because rails are laid in a street under the Tramways Act, a heavier burden of rating should be put upon the owner thereof than would be the case if the same rails were laid and used in an identical position and manner, but were called a tramroad or a light railway instead of a tramway.

I am, sir, etc.,

Stephen Sellon, M.Inst.C.E.

Stephen Sellon and Partners,
36, Victoria Street, London, S.W.,
*August 30, 1913.*

**Luggage Trailers.**—There is a suggestion that the Birmingham Corporation should follow the example of Dresden and put trailers on some of the tramcars for the purpose of carrying luggage. The idea has already been considered, but the matter will require much investigation before it can be put in practice.

**New Electrical Station at Glasgow.**—The City Council have authorised Mr. W. W. Lackie, the engineer of the electrical department, and Bailie W. B. Smith, the convener of the committee, to visit the United States and Canada for the purpose of inspecting the largest electrical installations in operation there. The visit is considered advisable in view of the necessity for providing a new electrical generating station for the city. Bailie Smith, of the Electricity Committee, said they were acting on the principle that a thing well begun was half done. They had bought the best piece of ground for the purpose in the whole city at a price one-fourth less than was paid for either of the two other stations One of the greatest electrical authorities, Dr. Ferranti, had advised them before they did anything in Glasgow to visit America. Those responsible for the spending of over a quarter of a million wanted to learn every detail in which they could economise. Bailie Smith said that no consultiug engineer would be employed on the new station; their new staff were quite capable of acting as consulting engineers.

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THE
# Tramway and Railway World

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LONDON, SEPTEMBER 11, 1913.

**Sheffield's Tramway Undertaking.**

In our present issue will be found a fully illustrated and detailed description of the tramway system owned and worked by the Corporation of Sheffield. The annual conference of the Municipal Tramways Association, which will be held in the centre of the British steel making industry, is now only a few days distant, and the members attending the Conference will be interested in all the details connected with the tramway undertaking in Sheffield. So far as the engineering and the construction work of this tramway system are concerned, there is nothing of a very exceptional nature. Some of the lines have been running electrically for no less than 14 years, and during that time the system has been greatly extended. Sheffield has an independent power-station for the tramways, and this station has grown with the growth of the system, so that at present the plant is of a somewhat varied nature, and does not represent one systematic scheme drawn up at one time. In regard to the operation of the tramways, it will be noted that Sheffield was one of the first of the larger centres to adopt a maximum penny fare within the municipal boundary. The financial results have all along been satisfactory, though no effort has been made to build up a very large reserve fund. Owing to the age of many of the lines it is probable that the maximum annual charge for track renewals has now been reached, and indeed within recent years the Corporation have spent large sums in renewing the tracks. Thus it is that although a certain sum is set aside out of profits every year for renewals, the renewals fund is not increasing. It is, however, showing itself ample for requirements. One of the features in Sheffield, which is shared by a number of towns in the north, is the very hilly nature of the routes traversed by the tramways. In spite of this the working expenses are reasonably low, and at the same time there has been great freedom from serious accident. Members of the Conference who have not yet taken up the subject of vestibule cars will be interested in watching the operation of the vehicles of this class in Sheffield. Altogether they will find that the system, both as regards construction and as regards operation, is an eminently practicable and workmanlike affair, serving the citizens well, paying its way, and contributing substantially out of profits to various public objects of the city.

**Design of Bogie Trucks.**

Recent developments in the field of heavy electric traction on railways have brought up again several questions of importance in the design of rolling stock both on the mechanical and on the electrical sides, and one of the most difficult of solution is that of the proper design of bogie trucks. The conditions under which bogie trucks run on electric railways differ considerably from those which are met with in tramway working on the one hand, and in ordinary steam working on the other. On tramways the load to be carried is smaller, the speeds are lower, but track conditions are usually worse than in railway working. Bogies for use under coaches in steam railway working are not required to transmit any driving forces, being merely trailers and, although the design of a good trailer bogie is difficult, several very satisfactory designs are running on our great railways. The question of suitable materials to be used in construction of trucks is however, worth consideration. When electric traction was first introduced into this country, steel was the substance mainly used in truck

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construction. The cast-steel side frame was almost universal, and it was not until after a good deal of running that it was found that this material left a great deal to be desired. It was found that cast-steel side frames were very liable to crack and break at points where the cross sections changed. The trouble is, of course, to obtain satisfactory castings in the comparatively thin sections employed, especially at such points as the side of the spring pocket where the I section changes to a large mass of metal. The large mass of metal, in cooling in the mould, draws the metal away from the smaller section, leaving flaws in the casting at places where such alterations occur. Test pieces cut from such a fractured truck side give, in most cases, very satisfactory results, and the metal itself cannot be blamed. If it were possible to obtain really satisfactory castings, the cast-steel side frame would be a most excellent solution of the difficulty, as it lends itself to very simple truck design. In America it is stated that good results have been obtained by the use of vanadium steel in steam locomotive side frames, and it may be possible to obtain sound vanadium steel castings for truck sides. But cast steel for this purpose has now such a bad reputation among railway engineers that it would require a brave man to go back on previous experiences.

* * * *

A substance has to be found to take the place of cast steel, and two substitutes are in general use, namely, pressed steel and forgings. Of these, the former is at present in great favour, though signs are not wanting that it may have to be abandoned in favour of forged truck sides. The very high temperature at which the metal has to be worked in order to get satisfactory pressed steel stampings tends to kill the nature and fibre, especially at the corners, and trouble has arisen owing to the metal tearing at these points when previous calculation led the designer to believe there was ample strength. As a general rule sharp corners have to be avoided, and this is very difficult in the limited room which is disposable. Trucks in which use is made of rolled-steel channel iron, on to which cast-steel horn blocks are riveted, have been tried with fair success, and development along this line may prove the most satisfactory solution of a very difficult problem. With regard to the metal work generally in truck construction, there seems to be a very general reversion to good quality iron instead of mild steel for transomes and other members under considerable stress. Ordinary mild steel is not so fibrous as good quality rolled iron, and it seems to crystalise much more rapidly, and though—strength for strength—the iron is heavier than steel in the first place, its greater dependability is causing it to be viewed with ever increasing favour by rolling stock engineers.

**London Motor Traffic.**

Just at the close of the Parliamentary session in August the Select Committee of the House of Commons, who had been hearing evidence for several months on the subject of accidents arising from motor traffic in the metropolis, presented their report. It is a very voluminous document, and though in our present issue we present a somewhat full abstract, those who are specially concerned on the subject would do well to read the report in full, which has been published in the ordinary way as a Parliamentary paper. The Committee felt themselves obliged to investigate a great variety of points in connection with London street traffic in order that they might be better able to make proposals for the prevention of accidents. Of course, the scope of their inquiry was not nearly so extensive as that of the Royal Commission on London traffic which reported in 1905, but so far as the recommendations of the present Committee go they bear out and corroborate many of the conclusions of the Royal Commission. In regard to most of the recommendations securing the safety of the public there will hardly be two opinions, and it will be the business of the Government to see that they are carried out. All tramway authorities will agree that the proposal of the veto of the Metropolitan Borough Councils against tramways should be abolished. The proposal of the Committee which has raised the greatest opposition is unfortunately the most important of their recommendations. This proposal is that the County Councils who have jurisdiction within the metropolitan area should be constituted traffic authorities for licensing, regulating, etc., and that from their decisions their should be an appeal to a new Traffic Branch of the Board of Trade to be



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specially constituted for the purpose. This recommendation has been met with wide disapproval; in fact, the only parties who appear to support it are those who may be described as extreme municipalists. It appears that all, or nearly all, of the members of the Select Committee are, or have been, members of local authorities. The proposal that a local authority should be in supreme control might be suitable enough in provincial towns, but is wholly unsuitable in the case of London. Moreover, two or three of the County Councils concerned are themselves the owners of extensive tramway systems, and their position would be most invidious if they were to be in control of all street traffic, including the omnibuses which compete with the tramways. The real and only solution of the whole problem, which is once more pointed out, is the formation of an independent Traffic Board composed of experts, and appointed by the Government with even wider powers in regard to the initiation of schemes and in regard to legislation than were proposed by the Royal Commission when they recommended the formation of such a Board. We deal further with the subject from the automobile point of view in the motor traffic section of this issue.

**Children's Fares.**

In gathering information from tramway authorities on the question of cheap fares for children, Mr. Mallins, general manager of the Liverpool tramways, found that there is no uniform practice. A number charge half-fares for children between the ages of 3 and 10 years, and several cases up to 10 and 14 years, which to some extent covers the school period. A number of other authorities, including London and Liverpool, do not make a charge for children under five years, but charge full fare over that except when special cars are hired. The most difficult problem in connection with the arrangement of preferential fares, Mr. Mallins observes, is the fact that school children generally travel during the maximum hours of traffic morning and evening, when the rolling stock is taxed to its utmost capacity on all large systems, with the result that overcrowding is increased. There is another aspect of the matter to which attention may be directed, namely, the relation of tramways to the public secondary schools set up of late years to serve a group of districts in large cities and towns. In some of these places, and in towns where one secondary school suffices, the tramway committees grant reduced fares, or if the transit facilities are in the hands of a company the Education Committee make themselves responsible for the payments. A pleasing indication of the municipal aspect of the transit undertakings in the industrial centres is that during the school holidays reduced fares are granted to children so that they may be enabled to visit the parks and other open spaces. This traffic can be arranged so as to utilise cars returning from the centre of the town after the morning rush traffic, and the same result can be achieved on the return journey. It is to be regretted that this course is not adopted by the London County Council, especially as the chairman of the Highways Committee is stated to possess powers to alter any fare in a downward direction while the Council is in recess. Moreover, for two or three years past the Council have granted school children very cheap tickets when accompanied by teachers, such as a halfpenny per head for any distance to a swimming bath, and one penny for a single journey and twopence return to playing fields and museums. It is understood that after the vacation the Highways Committee will consider the question of reduced charges for children accompanied by parents or adult friends during the slack hours. Perhaps the most generous treatment of children on ordinary occasions is that recently inaugurated by the Sheffield tramways, where half-fares are allowed up to the age of 15, while for children under five years no charge is made.

## HOURLY NIGHT CARS FOR MANCHESTER.

The Manchester Tramways Committee on August 26 considered a report presented by Mr. J. M. McElroy, the tramways manager, upon the petition recently presented to the committee asking for the institution of a service of all-night tramcars or motor omnibuses. Mr. McElroy stated that until the receipt of the petition recently presented there had been no clear evidence as to what the demand really amounted to. His opinion was that an hourly service of cars ought reasonably to meet the demand at the present time. From the point of view of the tramways department there were objections to the running of an all-night service, the principal one being that it made the efficient maintenance of the track and overhead equipment more difficult. If the committee determined to fall in with the views of the petitioners, the department would endeavour to carry out the minor repairs during the intervals between the running of the cars, and when more important repairs or reconstructions were necessary the services would have to be run by means of motor omnibuses. He recommended that the services be limited to week nights only, the demand for the early morning service on Sundays being so very small. The committee adopted the report, and it was confirmed by the City Council on September 3. The service began the same night.

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## RAILLESS TRACTION IN LANCASHIRE.

INAUGURATION OF THE RAMSBOTTOM INSTALLATION.

After a series of satisfactory trial runs the Board of Trade inspection took place on August 21 last of a new railless trolley system laid down by the Urban District Council at Ramsbottom, near Bury, Lancashire. The cars run from near Holcombe Brook Station, on the Lancashire and Yorkshire Railway, to the hamlet of Edenfield, on the road to Rawtenstall, passing through Ramsbottom, and calling at Ramsbottom Station, a distance of about three and a half miles. This will open quite a new but hilly district, containing some of the finest scenery in the country. The results of the venture are being closely watched by the adjoining local authorities; if satisfactory, the system will be extensively adopted by them to serve their respective tramways. As it is, the Edenfield terminus being a short two miles from the Rawtenstall, a short walk or a journey on electric trains over the three miles, Bury to Holcombe (lately opened by the Lancashire and Yorkshire Railway), will enable residents of Manchester and district to reach north-east Lancashire by a shorter route than the one through Rochdale and Bacup.

Lieut.-Colonel Druitt and Mr. Trotter made the inspection on behalf of the Board of Trade, and in addition to the inspecting officers the first car contained Councillor Wilkinson (chairman of Ramsbottom Urban Council), Mr. J. B. Hamilton, Mr. Jekin (assistant consulting engineer), Mr. W. Clough (manager, Bury Tramways), Mr. C. L. E. Stewart (manager, Rawtenstall Tramways), Mr. Clough (Clough, Smith, and Company, of London, overhead contractors), Mr. E. M. Munro (of the R.E.T. Construction Company, Limited), and Mr. J. Wild (manager of the Ramsbottom Tramways). The last-named was the driver of the car. The inspecting officers found that the system generally was satisfactory, and gave permission for immediate working. Four single-deck cars, each seating 28 passengers, are employed. Each has the R.E.T. Construction Company's double trolley of the under-running type, which allows the vehicle a radius

Ramsbottom Car on Level.

Car Descending Steep Gradient.

Ramsbottom Car Turning at Terminus.

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of 16 ft. from the centre of the trolley wires, of which there are four, in order that the car may be driven over the whole of the roadway. The car is driven by two 20-H.P. motors, and as it is driven only from one end at each of the three termini the overhead wires are in the form of part of a circle to enable the cars to be turned. The maximum weight of a car when loaded is five tons. The system is similar to that which has given such satisfactory results at Leeds, Bradford, Rotherham, and Dundee.

Messrs. Siemens supplied the electrical equipment, Messrs. Clough, Smith, and Company, London, the

**Despatch of First Railless Car to South America from Works of R.E.T. Company.**

overhead construction, Messrs. Brown, of Huddersfield, constructed the chassis, and the bodies were built by Milnes, Voss, and Company, Birkenhead, the main contractors for the whole of the work being the R.E.T. Construction Company, London, E.C. The current is supplied by the Lancashire Electric Power Company, at a pressure of 10,000 volts, which is converted to 500 volts in a small sub-station adjoining the new car depot in Stubbins Lane. The car shed will accommodate six cars, and there are also repair shops, store rooms, mess rooms, and offices.

## NEW TYPES OF R.E.T. CARS.

The great advance made in the design and production of highly efficient worm gear has made possible considerable improvements in the type of transmission gear particularly suitable for railless electric cars, and the R.E.T. Construction Company, Limited, taking advantage of this, have been able to produce some new types of cars, embodying improvements calculated to still further popularise this form of vehicle.

The improvements lie principally in the transmission gear, which now consists of a single worm reduction for each motor, dispensing with all chains, and achieving a higher mechanical efficiency, and at the same time reducing the weight.

Two examples of these cars are shown in the accompanying illustrations. Fig. 1 shows a typical example of a car for use in this country, and is fitted with the company's latest form of controlled trolley, capable of freest movements at any speed, and gives full control of a road 40 ft. in width. Fig. 2 shows another form of the same vehicle with a slightly different seating plan, the deck to the rear platform being only 24 in. from the ground, and the floor of car 2 ft. 9 in. from road level. Other forms of cars and trailers are shown in Figs. 3 and 4, which give some idea of the developments in hand. A number of cars of the above types are being constructed by the R.E.T. Construction Company, Limited, for work at home and abroad.

## THE WORKS OF HADFIELD'S STEEL FOUNDRY COMPANY.

The programme of visits which has been arranged for members of the conference at Sheffield of the Municipal Tramways Association includes a visit to the East Hecla works of Hadfield's Steel Foundry Company, Limited. These works are always of special interest to those connected with the maintenance of the tramway permanent way. Hadfield's patent "Era" manganese steel is so well known that it is unnecessary here to enlarge on its good qualities except to say that it is now recognised as of supreme value for parts of the permanent way, such as switches, mates, crossings, and curved rails, subjected to severe service conditions.

The East Hecla works are thoroughly up-to-date, and they are equipped with the most modern machinery. To take things in proper sequence we should first refer to the large pattern shop, which is fitted with wood working machinery of first class type. The foundry is the most extensive of its kind in the world, and covers an area of over 6½ acres. There are large annealing shops attached and also fettling shops. The grinding shops are necessarily important when it is remembered that although "Era" manganese steel is particularly ductile, it is so hard as to be commercially unmachineable. There are four machine shops furnished with electrically driven machine tools of various kinds. Then there are the forge and smith's shop, but enough has been written to show that at these works the visitor may rely on seeing something that will be both interesting and instructive. The Hadfield patent "Hecla" point is now so well known and appreciated that it is needless to go into details; in combination with "Era" manganese steel it is a switch that cannot be surpassed.

A reference should be made to the large lay-out floor. Here intricate junctions, as well as those of comparatively simple design, are built up and prepared for re-erection on site, thus avoiding the interruption to vehicular traffic, which is such an irritating feature in the construction of trackwork in the streets. We may add that Hadfield's are also in a position to supply steel-tyred car wheels. The centre is of a suitable grade of Hadfield's best toughened cast steel, whilst the tyre is rolled from a special grade of steel calculated to give the best results both as to safety and mileage. No set screws are used, the tyre being secured by Hadfield's special lockfast method, which prevents the tyre moving sideways or circumferentially.

## RAILLESS TRACTION SCHEMES.

### An Aberdeen Suburban Scheme.

The directors of the Aberdeen Suburban Tramways Company have had under consideration the question of extending their operations by the working of trackless cars or other mechanically-propelled vehicles, and they are satisfied that this course would not only be profitable in itself, but would attract fresh traffic. A resolution to that effect was approved at the last half-yearly meeting.

### Important Developments at Leeds.

The Tramways Committee recommend the following installations of the railless traction system: From junction of Wellington Road and Tong Road, *via* Copley Hill, Wortley Lane, Mill Green, Sydenham Street, Domestic Street, Holbeck Moor Road, Lane End Place, Hunslet Hall Road, Moor Road, and Church Street to Low Road; from junction of Whitehall Road and Lawns Lane, *via* Lawns Lane and Chapel Lane to a point in Chapel Lane near the Recreation Ground, 60 yards from Hall Lane.

**Belfast Tramways.**—The Glengormely branch of the Belfast tramway system has proved profitable, in spite of the doubts expressed when the line was purchased. In seven months the profits have been £1,017.

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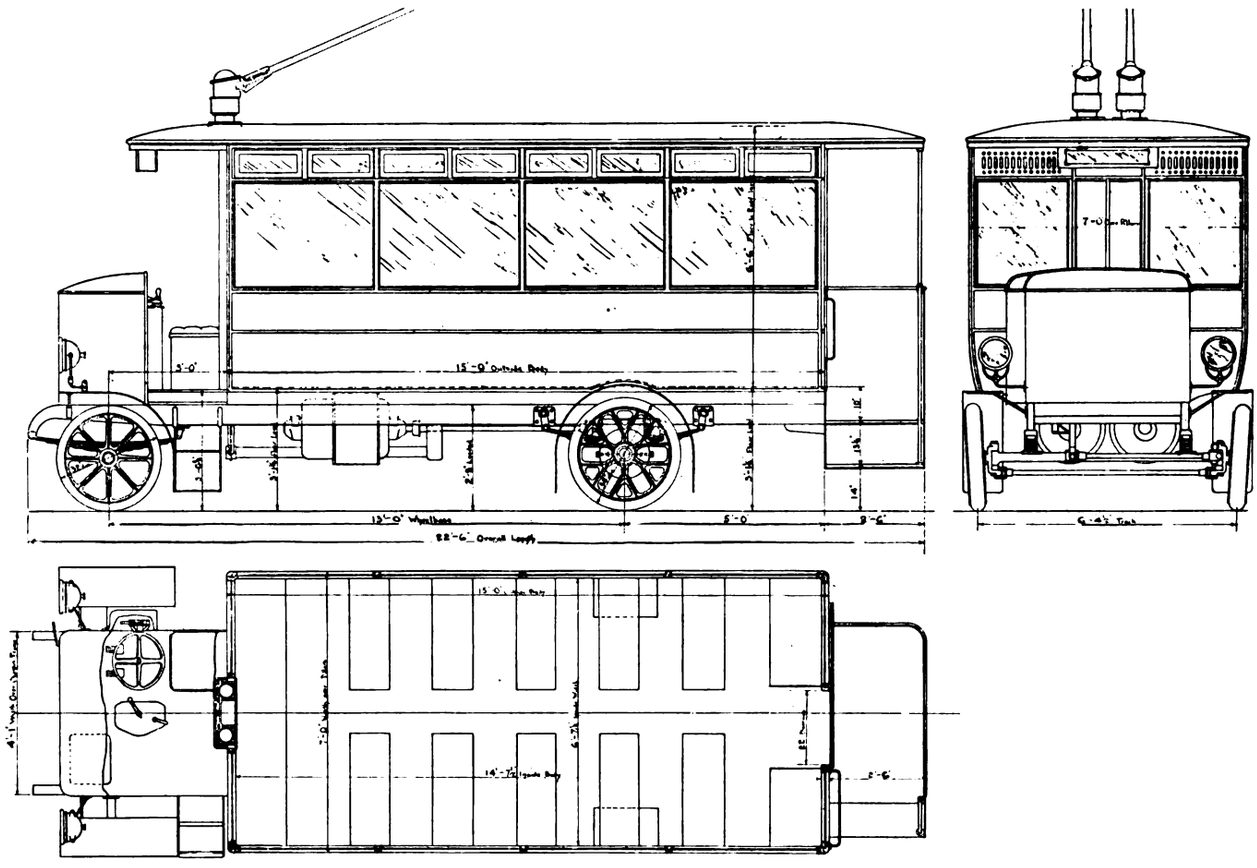

Fig. 1.

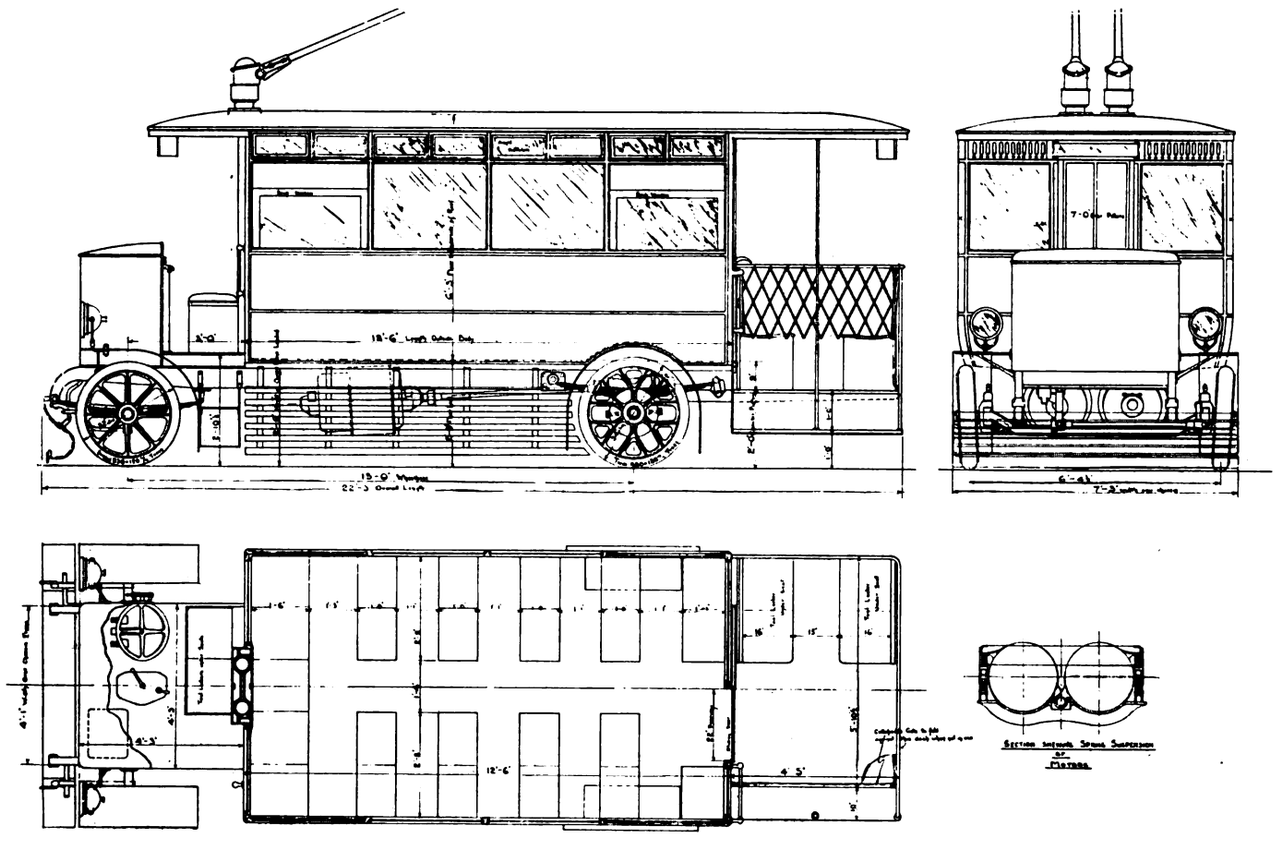

Fig. 2.

**Designs of R.E.T. Railless Cars.**

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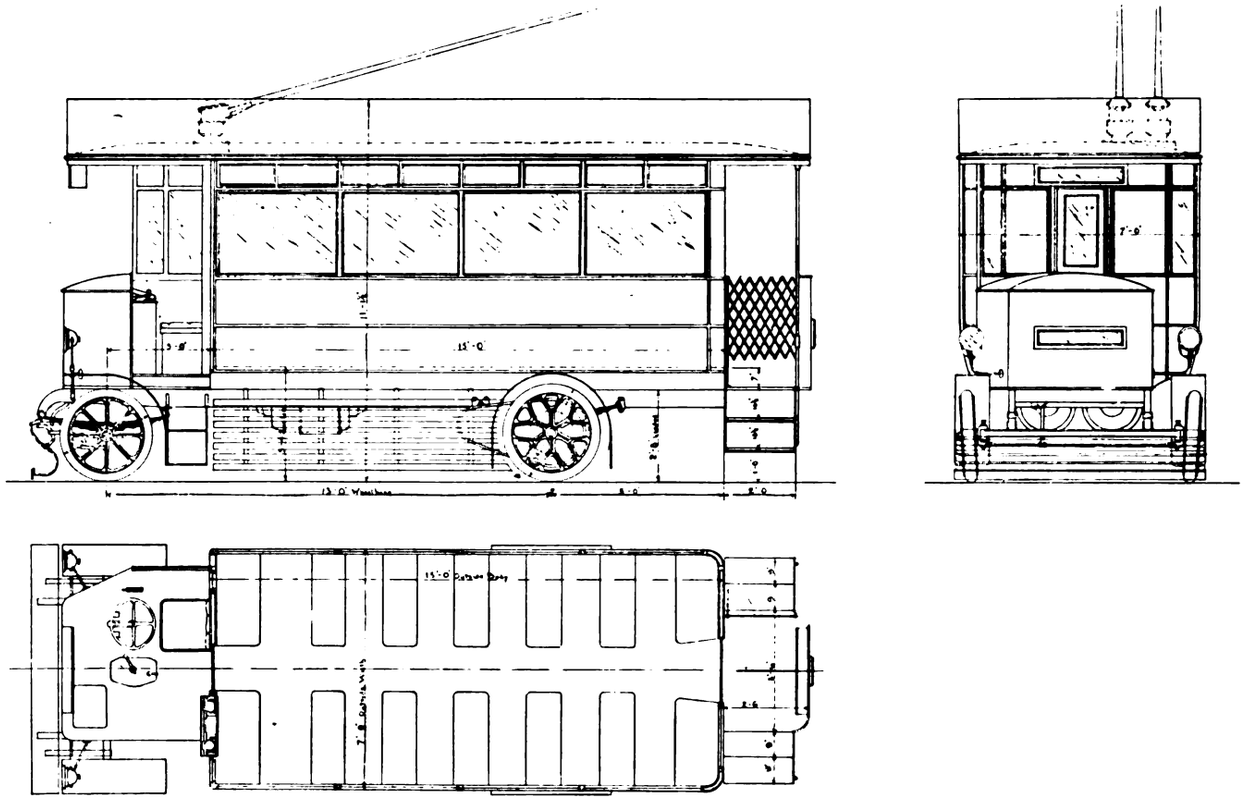

Fig. 3.

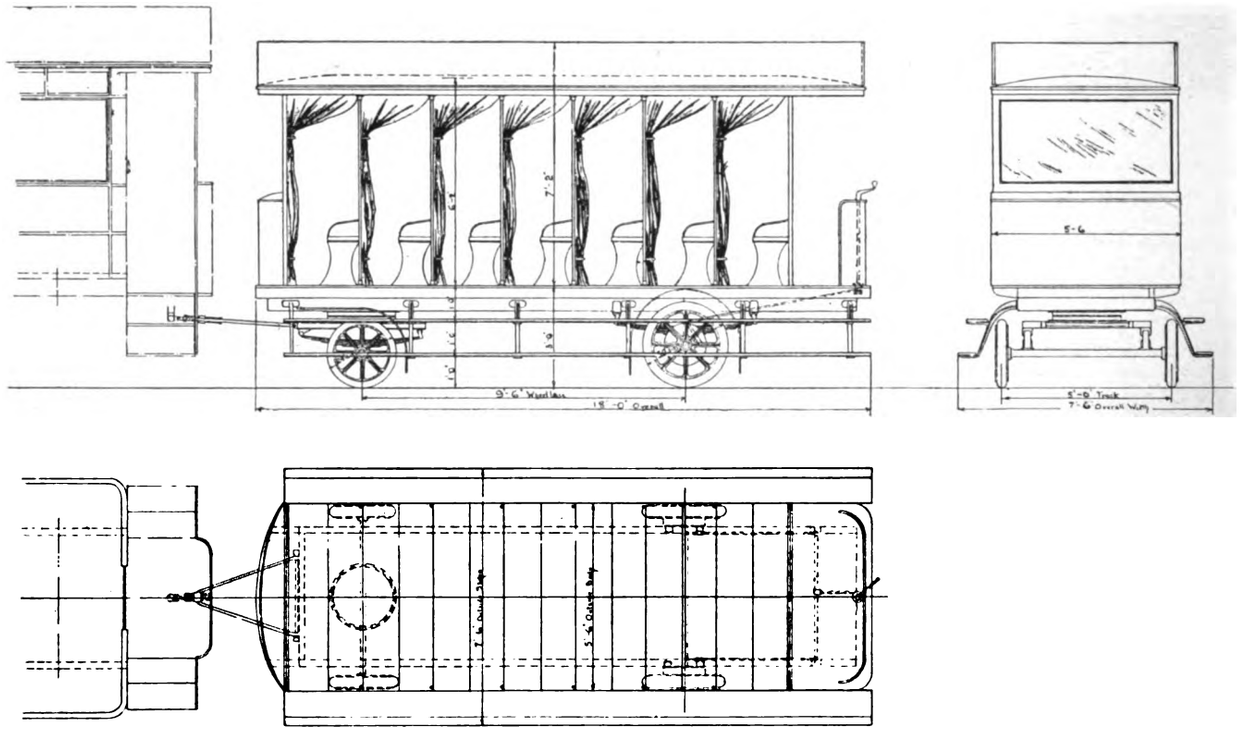

Fig. 4.

**Designs of R.E.T. Railless Cars.**

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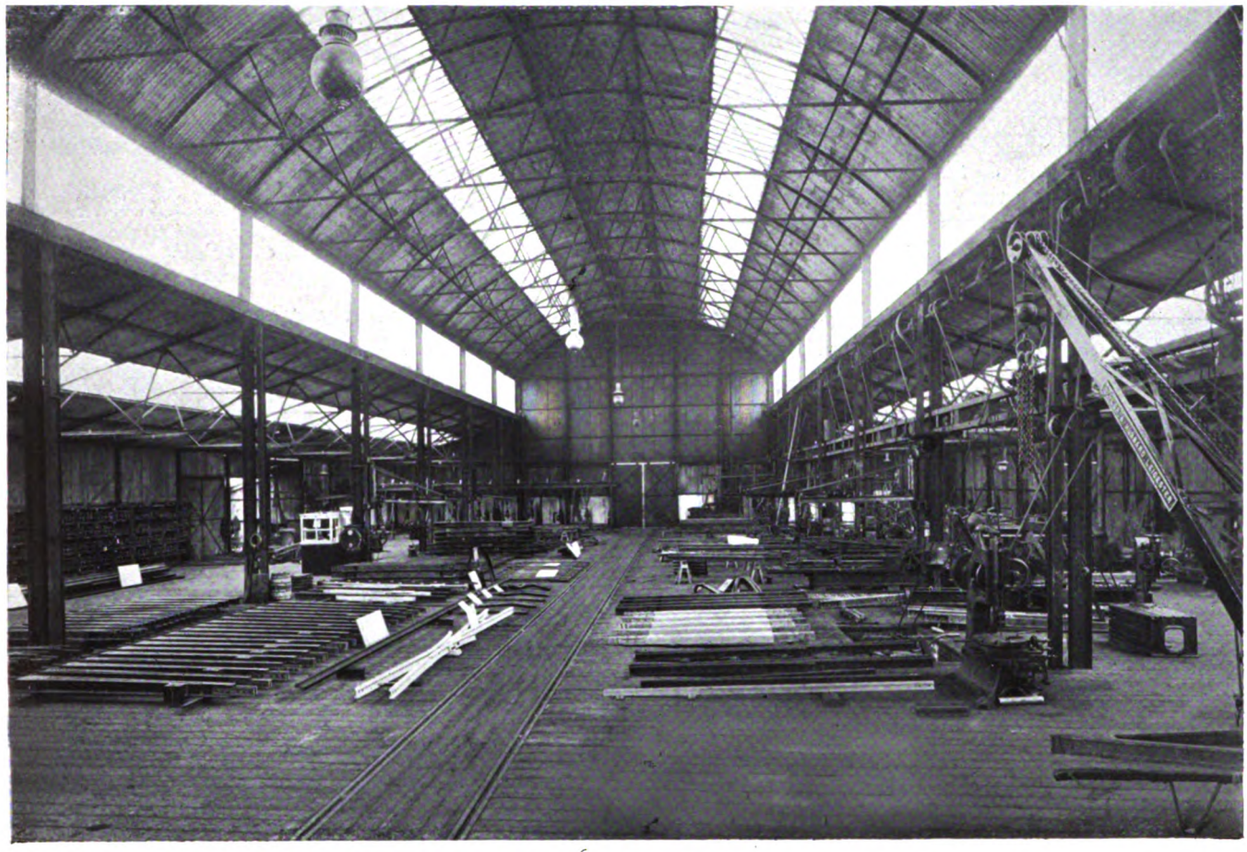
## EDGAR ALLEN'S STEEL WORKS.

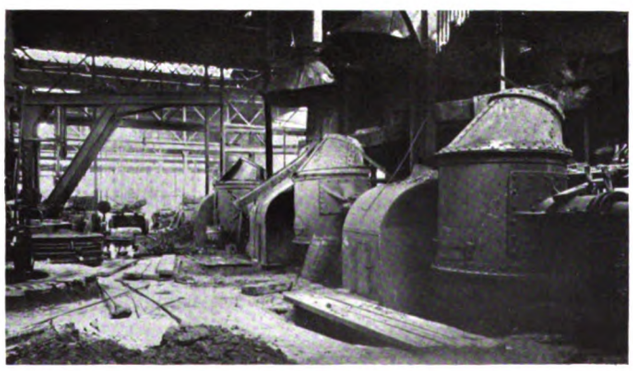
The members of the Municipal Tramways Association during the forthcoming annual conference at Sheffield are to include, among other works which they are to visit, those of Edgar Allen and Company, Limited. These works are well-known by reputation to tramway officers for their "Imperial" manganese steel, which is used so extensively for special track work. The company produce steel for many purposes, but for readers of this journal the principal interest is in connection with the tramway work. The company's output is over 50 tons per day, and their works, which originally occupied 5 acres, now cover about 23 acres, while very extensive shops are now being erected. Several of these are complete, and a very large foundry is also being built to cope with the increasing demands for points, crossings, and general castings. The foundry will be 500 ft. long with three bays, and 250 ft. wide, and will be one of the best foundries in the country. Unfortunately, owing to the delays in obtaining material, the foundry is some months behind-hand. During the past few years several new extensions have been made for dealing with tramway special work, and the railway department have also put down a special plant for dealing with the demand for railway material in rolled manganese steel, which Messrs. Allen and Company have made their speciality. They are making switches and crossings from the manganese rolled rails, which was impossible a year or two ago.



Point and Crossing Fitting Shop.

It is some 50 years since the chairman, Mr. Wm. Edgar Allen, began the manufacture of tool steel, which with files was the sole manufacture, but this was gradually extended. The process used by them is the "Tropenas." This was developed and perfected by the Company 20 years ago, and it has been a wonderful success and is now used by the British and Japanese Governments. The company's name is on the Admiralty, War office, India Office, and Lloyds' lists as

Tramway Pattern Shop.



Tropenas Steel Process.

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contractors for steel castings, tool steel, etc. The wages paid per annum amount to over £100,000. The area of the steel moulding floors, formerly about 22,000 sq. ft., is now 42,000 sq. ft., and arrangements are being made to increase this to 120,000 sq. ft.

In 1903, the firm took over the business of Messrs. Askham Brothers and Wilson, Limited, a firm well known in connection with tramway work as well as crushing and grinding machinery, and now Allen's imperial manganese steel points and crossings are known wherever a tramway is laid. Points and crossings up to 18 ft. long can be supplied. Several acres of land are set aside for the construction of lay-outs, and the company are in a position to put down any size of lay-out that may possibly be required. The point and crossing pattern shop is 135 ft. by 70 ft. wide, and a considerable portion of the machinery is run electrically. Messrs. Allen have their own electrical installation, and also take power from the town; in fact they are one of the most extensive users of the city's electrical supply.

Point and Crossing Foundry.

Lay-Out Yard.

They were the first to put down furnaces for melting by electricity.

The Edgar Allen air-hardening steel takes the highest rank in the market, and they have big demands from the United States, Japan, and the Colonies. They have their own warehouses in South Africa, Japan, New York, Chicago, etc., worked by staffs sent out from Sheffield. Messrs. Allen have recently increased their capital for the purpose of extending their works, and if labour troubles can be avoided tramway engineers can depend on their requirements, however intricate, being executed carefully and quickly. We believe that most of our readers are cognisant of the tramway work done, but the accompanying illustrations give some idea of the shops and of the work on hand. We understand that, labour troubles permitting, the company will have one or two large lay-outs, together with other work, ready for tramway managers to see when visiting Sheffield.

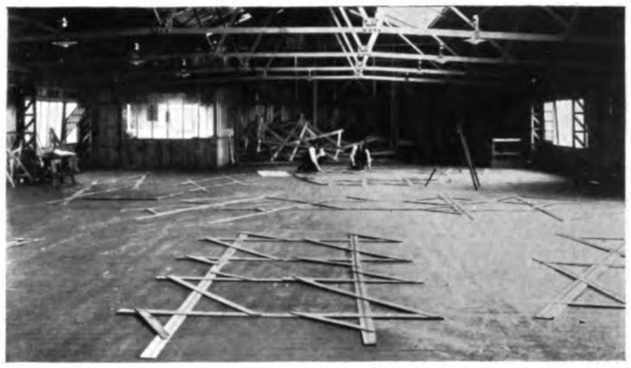
## "CEDES" RAILLESS TRACTION.

RUNNING COSTS ON THE FRIBOURG LINE.

Appended is the financial statement of the working in 1912 of the "Cedes" system of railless electric traction installed at Fribourg, Switzerland:

| WORKING EXPENSES. Dr. | £ | s. | d. |
|---|---|---|---|
| Administration and general expenses | 43 | 14 | 5 |
| Electric current .. | 89 | 5 | 9 |
| Staff .. .. | 407 | 5 | 11 |
| Maintenance and repairs (tyres £65 2s. 5d.) .. | 110 | 1 | 10 |
| Uniforms & printing | 81 | 15 | 6 |
| Insurance and taxes | 69 | 1 | 7 |
| Miscellaneous .. | 36 | 10 | 7 |
| | 837 | 15 | 7 |
| Balance to profit and loss account .. | 374 | 4 | 0 |
| | £1,211 | 19 | 7 |

| TOTAL RECEIPTS. Cr. | £ | s. | d. |
|---|---|---|---|
| Passengers and luggage .. .. | 1,182 | 17 | 4 |
| Goods .. .. | 22 | 16 | 0 |
| Sundry receipts (sale of time-tables) .. .. | 6 | 6 | 3 |
| | £1,211 | 19 | 7 |



Lay-Out Floor.

Manganese Steel Lay-Out.

The number of passengers carried was 98,318, and the number of miles run by the cars, 37,659. The receipts per mile run amount to 7·5d. The running costs of the Fribourg line total 5½d. per car-mile. The sharpest gradient on this route is 1 in 9, and during the winter months the cars run through snow.

**Accumulator Traction.**—The Australian *Mining and Engineering Review* states that the Townsville, Queensland, Council has granted Messrs. Minham and Sons an extension for six months of the option for their scheme of electrical tramways on the electric accumulator system.

**Largest Tramway Depot.**—The Lichtenberg car shed of the Greater Berlin Tramway Company which was recently opened is declared to be the largest tramway depôt in existence. There is now accommodation for 500 cars. It is proposed to accommodate the two thousand employees in a garden city formed around the depôt.

**The Tramcar Habit.** Sir Ian Hamilton, in the course of a report on Canadian military affairs, mentions that the city corps require training in pedestrianism for the reason that they suffer from the prevailing Canadian habit of preferring any other mode of locomotion to making appeal to their legs. Their chief function, he declares, seems very often to consist in standing in the street waiting for a tramcar.

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# LONDON TRAFFIC REGULATION.

## Report of the Select Committee.

The report of the Select Committee, who were originally appointed by the Government on November 27, 1912, was issued on August 14. Their principal recommendation is that a new Traffic Branch of the Board of Trade be set up as a Traffic Board to advise Parliament in all metropolitan traffic matters.

### Recommendations.

The Committee's own summary of their proposals is given in full below:

(1) That in all metropolitan traffic matters Parliament should be advised by one department, which should combine the traffic duties of the Home Office, the Local Government Board, and the Board of Trade, including the confirming of by-laws.
(2) That a new Traffic Branch of the Board of Trade be set up to perform the above and other duties.
(3) That the veto of Borough Councils in regard to tramway schemes be replaced by a full hearing before the new Traffic Branch, which shall report to Parliament. That Standing Order 22 be revised.
(4) That County Councils in the metropolitan area should have the widest possible by-law-making powers, subject to confirmation by the new Traffic Branch of the Board of Trade.
(5) That all mechanical stage carriages and hackney carriages be brought under closer control; that the routes, time tables, and number of stage carriages be subject to County Council regulations confirmed by the new Traffic Branch of the Board of Trade, with a right to local authorities and other interested parties to be heard, such right to extend to any decision of a Council relating to these matters, or the refusal or neglect of any Council to take action when requested to do so; that the design of mechanical stage carriages be subject to the new Traffic Branch, which should have independent expert advice.
(6) That the licensing of stage carriages and hackney carriages be a duty of County Councils and County Borough Councils, subject to a right of appeal to the New Traffic Branch.
(7) That special speed limits for motor omnibuses and other heavy motor traffic be imposed where conditions are especially dangerous.
(8) That closer control of traffic be exercised by the police.
(9) That traffic points be fixed at a greater number of crossings.
(10) That more refuges be provided.
(11) That so soon as practicable means be taken to remove the congestion caused by dead ends of tramways, street markets, and roadway obstructions.
(12) That the measures already taken through the schools to warn children and parents as to street dangers should be continued and extended.
(13) That suggestions as to amendments of the law and other matters mentioned in the report be carried into effect.

The report, which is of much interest, was issued in the form of a "White Paper," and covers 42 pages, of which we give a brief summary:

### Points from the Report.

The reason for the appointment of the Committee was the increasing number of fatal accidents in the metropolis, due to motor omnibuses and other forms of power-driven vehicles. In pursuing this inquiry, the Committee held 42 sittings and examined 54 witnesses. They found it impracticable to consider the question of safety separately from the general traffic problem of London. Referring to the Royal Commission on London Traffic, which reported in 1905, the Committee observed that many of their recommendations, if carried out, would have tended in the direction of public safety, and most of those recommendations have only become more urgent in the time elapsed since they were made. The changes which have taken place since 1905 are due to the development of mechanical traction, as will be seen from the statistics appended:

| | Horse Cabs. | Horse Omnibuses and Tramcars. | Electric Cars and Motor Omnibuses. | Motor Cabs. |
|---|---|---|---|---|
| 1907 .. .. | 9,818 | 2,961 | 2,973 | Nil. |
| 1912 .. .. | 2,385 | Nil. | 5,767 | 8,000 |

The difficulties described in the report of the Royal Commission have been intensified by this change. The development of the inward and outward current of travel is shown by the following figures. In 1904 the journeys taken per head of population amounted to 150, and this figure has increased to 228 per head. The total numbers for 1911 are:

| | |
|---|---|
| Tramway passengers .. .. .. .. | 821,819,741 |
| Omnibus passengers .. .. .. .. | 400,628,487 |
| Local railway passengers .. .. .. .. | 436,398,745 |
| Trunk railway passengers from a 30-mile limit | 250,000,000 |
| | 1,908,846,973 |

The daily increase is not less than 250,000, and by 1920 it is estimated that the number of journeys will exceed 3,000,000,000.

In the administrative county of London the numbers of fatalities during the last three years were—in 1910 281, in 1911 357, and in 1912 422. The increase in the number for 1912 over 1910 in the Metropolitan Police area was 149; the increase for the same period in the administrative county was 141. This justifies the inference that the causes producing fatalities operated more severely in the smaller area. There was no such increase of population as would account for the increase either of fatalities or of accidents. The population of the larger area in 1904 (including the City of London) was 6,775,645, and in 1912 it was 7,340,079. The percentage of accidents to population increased from ·177 in 1904 to ·303 in 1912.

During the last three years the fatalities caused by horse-drawn vehicles in the Metropolitan Police area have not varied to any great extent. In 1910 they were 167, in 1911 135, and in 1912 168, but the fatal accidents in which power-driven vehicles were concerned were 214 in 1910, 284 in 1911, and 369 in 1912. As the number of horse-drawn vehicles has considerably decreased, there is evidently some cause producing a larger percentage of accidents in which the smaller number of horse vehicles are concerned.

During the last three years the fatalities have increased enormously, and the amplification of the traffic has outgrown the methods for dealing with it. A dictator for a half a dozen years would have a difficult task, owing to the inherent physical obstacles he would have to encounter. In London such a solution is, of course, impossible, and the committee consider that existing institutions must be used with such developments as experience dictates, and with proper regard to existing rights and interests.

Three methods of securing powers to construct tramways are open to promoters, with advantages for one or other purpose attending each. Three Government departments are concerned in the regulation of matters connected with street traffic in London, yet none of them, nor all of them together, is responsible for the whole of it. Three types of municipal government are seen in the area of the London administrative county, the ancient City Corporation, the London County Council, and the Borough Councils. Outside, in Greater London, County Councils, County Borough Councils, Borough Councils, and Urban and Rural District Councils have rule, with separate and sometimes diverse interests. The total number of local bodies in the outer ring is 142. This area of nearly 700 square miles is—except the City—under the control of the Metropolitan Police. The existence of this police force under the control of the Home Secretary and not under municipal control, is itself a significant fact, which separates the conditions which the committee have had to consider from the conditions of any other great populous area in the United Kingdom.

The Committee have had forced upon them the conclusion that a speeding up of every department of municipal and parliamentary government is necessary. Control of the streets is essentially a municipal function, and the same men should have before them the question of the adequacy of the streets, the facilities for traffic and its regulation, and the safety and convenience of pedestrians. Parliament could not be expected to deprive itself of power to secure equitable arrangements in the local legislation which it enacts, and in the supervision of local affairs by the various departments of State. It remains, therefore, so to adjust the municipal institutions of the metropolitan area and the instruments by which Government exercises control, that the public may feel confidence in the justice and impartiality of the decisions taken.

The Committee does not feel that a comparison between tramway and non-tramway streets, to which considerable importance was attached by Sir E. Henry, was of much assistance in indicating to them any method of securing greater safety; for fatal accidents are quite as numerous in streets where there are no tramways as in those where such lines exist. Mr. A. H. Stanley, who gave evidence on behalf of the London General Omnibus Company, did not lay any stress on the presence of tramways.

The rate of personal injuries per million passengers for the London County Council trams was ·86, which compares reasonably, though not commendably, with the provincial rates. These rates in 1912 were: Glasgow, ·69; Leeds, ·58; Liverpool, ·68; Manchester, ·70; Newcastle, 1·05. Each of these cities shows a progressive improvement in the five years. The record of the outer ring of London is not so good, for the personal injuries numbered 2·2 per million, and this year has the worst figures for the five years.

The table handed in by Colonel Hellard brings out a very striking comparison showing that electric railways have an immensely more favourable record for injuries, and for fatalities a record equal to tramways, and much superior to the omnibuses. The character of



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public vehicles on the streets closely affects the question of public safety. The design of tramcars is subject to two bodies—the Board of Trade and the Metropolitan Police. The Board of Trade have to inspect every tramway before it can be worked, and have made it a rule that promoters shall submit drawings of their cars before they have them built. The brakes of the London County Council are the most powerful known. While the brakes of some of the other tramway systems do not, perhaps, come quite up to the London County Council standard, they are considered satisfactory by the Board of Trade. Powers possessed by the police enable them to refuse a licence until they are satisfied that the brake is in proper working order, and they also inspect cars on the streets at any moment that seems fit to them. The Committee think, however, that the control of the brakes by one department should be sufficient, and that the experience of the Board of Trade fits it for this responsibility. The minimum of inspection while the vehicle is actually on the streets should be aimed at, and the management should be responsible for a system of daily inspection which will ensure that no vehicle will appear on the streets in an improper condition. The design of safety-guard which has been adopted by the London County Council Tramways has proved very effective, and has been approved by the Board of Trade.

### Development of the Motor Omnibus.

The London General Omnibus Company afforded the fullest details to the Committee of its methods of working and control. While some points are open to criticism, on the whole the Committee recognise that the company is managed in a most capable manner. Motor omnibuses commenced to run in London in 1897, and their development has been exceedingly rapid. From the first type of omnibus employed down to the present "B" type there have been 32 designs, all of which have had to conform to the regulations of the Local Government Board as to heavy motors and the requirements of the Chief Commissioner of Police. The latter had a very difficult part to play in this development, as he had to protect the public and yet to permit that street experience which could alone make the vehicle permanently safe for public use. The accident record of the motor omnibus is set out below:

| Year. | Licensed. | Fatalities. | Per 1,000 Buses. |
|---|---|---|---|
| 1907 .. .. .. | 1,205 | 35 | 29·0 |
| 1908 .. .. .. | 1,133 | 62 | 54·7 |
| 1909 .. .. .. | 1,180 | 59 | 50·0 |
| 1910 .. .. .. | 1,200 | 70 | 58·3 |
| 1911 .. .. .. | 1,962 | 114 | 58·1 |
| 1912 .. .. .. | 2,908 | 182 | 62·6 |

Further improvements in design are foreshadowed, but not with great confidence. Mr. Worby Beaumont in his evidence before the Committee, said that he hoped for solid tyres for omnibuses made so that they will offer the probability of very greatly reducing, if not eliminating, the side-slipping danger. Some criticism was made on the type of brake on the motor omnibus in evidence from representatives of drivers, but Mr. Beaumont stated that the brakes were fully competent to hold the driving wheels tight and prevent their rotation. The difficulty lies not so much in the brake as in the vehicle, and its responsiveness to the brake on a smooth road. According to the evidence submitted, there appears to be great difficulty in securing a satisfactory life-guard to motor omnibuses. The London General Omnibus Company have a staff of a dozen men continually experimenting, but no progress appears to have been made with a front guard, though the problem of a side guard appears to be in course of solution.

The Committee say they have not exhausted the question whether a lighter omnibus would not avoid many of the present dangers. If reducing the weight would make the vehicle much more safe, the financial effect should not be given too much weight, and it is a problem which expert advisers might decide. Mr. Beaumont was of opinion that the omnibus is not too heavy and too powerful for the brakes, in view of the present conditions of London traffic. He considers a lighter vehicle desirable from other points of view.

He also stated that in addition to acting as technical adviser to the Chief Commissioner, he was technical adviser to the motor omnibus companies; and the Committee think that the technical adviser to the Chief Commissioner should be an independent official.

Both the tramcar and motor omnibus are dangerous vehicles from their weight and bulk and the power of their engines, and the systematic training of drivers is consequently a necessity. The Committee feel that the practice which prevails of paying motor omnibus drivers by the journey is inimical to safe working in crowded traffic.

### Stopping Places.

The position of tram lines in the middle of the roadway raises a very acute traffic problem, which the Committee discuss at some length. This difficulty is aggravated by the presence of the motor omnibus, which exaggerates the danger while tramway passengers are crossing to and from the pavement. In connection with this cutting in upon tramway passengers, the question of stopping places for both tramcars and omnibuses appears to arise. A new solution, which seems to approve itself to the Committee, is that representatives of the local councils, tramway and omnibus authorities, and the Police Commissioner should meet and consult together. In this way it is hoped that a solution will be found for what has hitherto been a real difficulty. The Committee think that if there were present at this meeting an independent chairman from the Government department, a method of minimising friction and promoting safety would be secured.

The London County Council proposed a by-law to the following effect: "No driver of an omnibus or other stage carriage shall stop such omnibus or stage carriage to take up or set down passengers in such a position in the immediate vicinity of any tramway stopping place as to cause obstruction to passengers or intending passengers alighting from or entering any tramcar."

The Committee think the principle suggested to be reasonable. As regards speed, the Committee do not recommend any alteration of the maximum for tramways nor for motor omnibuses, and they are of opinion that the procedure by which speed limits are fixed is satisfactory, and that the County Councils are the proper authority through which applications should be made, local opinion being duly heard. The Committee are of opinion that both tramcars and motor omnibuses should be fitted with speed registers as soon as practicable. Slow-moving traffic is the cause of great delay, and the Committee recommend that a by-law should be immediately passed putting into operation the recommendations of the Royal Commission of 1905 that all vehicles proceeding at a slow or walking pace should be required to keep as close as practicable to the kerb. A serious cause of congestion within the inner ring is the existence of tramway "dead ends," and the Committee repeat the comment of the Royal Commission that it was difficult to appreciate how such a state of things could be tolerated so long, and whatever view might be held of the expediency of extending tramways in London, it cannot be expedient to work those we have upon inefficient methods.

Evidence was given which showed that there was considerable risk of accident and obstruction arising from the presence of many vehicles in an unsound condition, and the Committee considered it desirable that a by-law should be framed imposing penalties on any driver or owner who knowingly sent out an unsound vehicle.

### Street Widenings and Contributions of Tramways and Omnibuses.

The running of motor omnibuses has had considerable influence upon the question of street widenings. When widenings are made for tramways the tramways bear a large proportion of the cost, on the ground that they are introducing through traffic which did not before exist. Motor omnibuses are now running down similar streets, and they introduce through traffic which produces necessity for street widening, but provide no revenue to pay for it. Tramways also pay for paving the track and a portion at each side. These costs, with rates and taxes, are represented as being a charge of about £200 per car annually. A paragraph in the report of the London Traffic Branch of the Board of Trade for 1911 states that omnibus companies pay no rates in respect of the roads which they use, but motor omnibuses pay "in the shape of the petrol tax about £45 per vehicle per annum. . . . Of the two, the tramways are less unfavourably situated in regard to these burdens." Colonel Hellard, head of the London Traffic Branch of the Board of Trade, who was not responsible for that volume, admitted the comparison was incorrect, and withdrew it.

When asked if he had to pay towards track and road improvements and rating on track equivalent to what the London County Council has, of £200 per vehicle, Mr. Stanley said he thought it would mean to the motor omnibus proprietors of London a sum somewhere about £600,000.

### Abolition of the Local Veto.

As regards Parliamentary procedure, the Committee alluded to the obstruction offered to the building of tramways by the Metropolitan Borough Councils which have the right of veto, and they found that the extreme use of the veto goes beyond the purpose for which it was intended. The veto was originally granted to local authorities to prevent them being harassed with speculative schemes promoted by private interests. It was not at that time contemplated that there would be a central municipal authority which would become the sole tramways promoter in London. Standing Order 22 of both Houses of Parliament was meant to secure that local authorities should be consulted before private tramway schemes were submitted to Parliament, but the same check is no longer necessary to safeguard public interests. The Committee agree with the conclusions of the Royal Commission that any reasonable objection to the abolition of the veto would disappear after provision were made for the local authorities to state their views concerning any proposed tramway scheme to an independent and impartial body such as the new Traffic Branch which the Committee recommend.

### The Traffic Board and its Duties.

It is agreed by all parties that the development of the motor omnibus has rendered very great service to London, but the omnibus has

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yet to be put under proper control. After careful consideration of the matter the Committee are of opinion that the routes, time-tables, and number of such carriages should be subject to regulations formulated by County Councils and County Borough Councils and confirmed by the new Traffic Branch with a right to local authorities and others interested to be heard. The Committee have carefully considered the question of machinery best to be used in controlling and providing for London traffic. These powers and duties are at present scattered, duplicated, and incomplete. The bodies to which they are entrusted are very numerous, and tenaciously uphold local interests. It becomes a question, not of setting up an ideal system which might meet with a maximum of opposition, but of utilising as far as possible existing bodies and laws, so as to enable them to meet the changed conditions with the least friction and delay. The Committee are of opinion that what is required is a new arrangement of the functions of Government departments. The duty of originating and accommodating traffic schemes and regulations is in their opinion a municipal duty. Co-ordination can be secured by consultation between adjoining municipal authorities, under the direction and advice of a Government department which is its itself properly constituted to meet the special conditions. In the outer London ring there are five counties, and each has within it many authorities. They cover an area of some 600 square miles. There are in addition the Metropolitan Borough Councils, which are important bodies with great financial resources behind them and representing important interests.

The Committee believe that the arrangements they suggest will be such as to secure their confidence. At present, as has been set out, no one Government department fulfils the requirements. The Committee contemplate a body of sufficient standing to command the respect and confidence of Parliamentary Committees and of all the municipal authorities with which it will come in contact. It should supersede or absorb the London Traffic Branch of the Board of Trade. It should consist of a small number of specially qualified persons, and the choice should not be limited to Government officials. Expert advice of the highest character should be put at its disposal. The Committee do not propose that the body should be a separate Government department, but recommend that it should be a branch of the Board of Trade.

The duties of the new Traffic Branch as briefly outlined by the Committee are as follow :

All schemes relating to London traffic presented to Parliament should be examined and reported upon by it, and no other Department should report to Parliament, except through it.

It should actively concern itself with the traffic problems of London, working through and in harmony with the various existing bodies responsible for the various areas.

It should hold conferences, if requested or by its own motion, with the representatives of various municipal authorities concerning the development of through traffic routes, and other matters in which common action or agreement is advisable.

It should have power to hold public inquiries in order that the interests of localities may be ascertained, and due weight given to them in consideration of all projected undertakings or new by-laws. It should have power to summon witnesses.

All by-laws relating to London traffic should come before it for confirmation. It should be the confirming authority for the regulations of County Councils and County Borough Councils as to routes, etc., of stage carriages; and should hear appeals from the decisions of Councils.

It should fix, where it considers necessary, on the application of a local authority, special speed limits for motor omnibuses and speed limits for all motor traffic.

It should have power to regulate the structural character of all stage carriages.

It should receive reports, from the police and parties concerned, of all traffic accidents, and special reports from coroners of inquests.

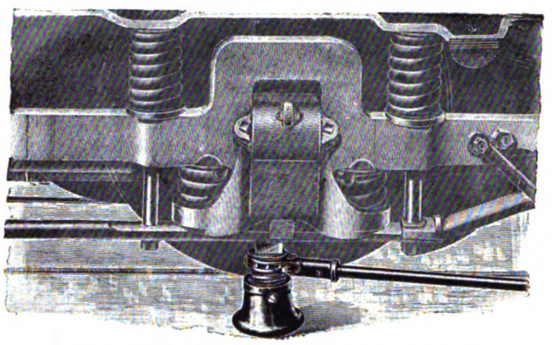
Other duties might be laid or devolved upon it as experience suggests.

**Standing Compartments in Bombay Cars.**—Bombay Council have adopted a recommendation by the Tramways Committee that the company be allowed to introduce two standing compartments in their bogie cars for a period of three years from January, 1914, to provide accommodation for passengers during the crowded hours of traffic. The passengers are to be allowed to stand, the convenience having been demanded by the public.

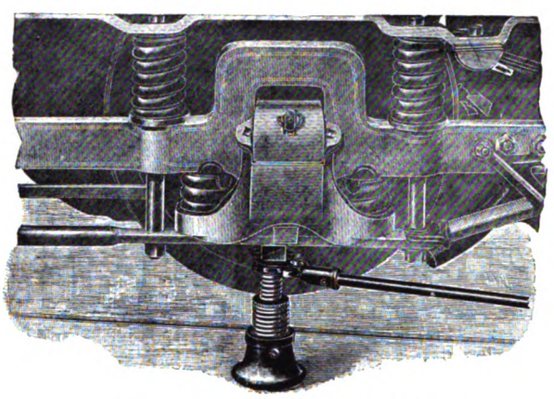
**Municipal Tramway Authorities' Influence in Parliament.**—In a report presented to the London County Council, the Parliamentary Committee referred to the deletion of clauses inserted in the Council's Bill by a Committee of the House of Commons, giving compulsory running powers to the London United Tramways Company over certain lines to be purchased by the Council. The Committee added: "We feel that the success which has attended the Council's action in this matter is very largely due to the efforts of the members who spoke on behalf of the Council. Valuable assistance was also rendered by many of the local authorities owning tramway undertakings throughout the country."

## SOME USEFUL APPLIANCES.

The lifting and other appliances, most of them interesting to tramway engineers, manufactured by Messrs. Youngs, Ryland Street Works, Birmingham, have been well known for nearly 60 years. Their new patent worm screw pulley block, besides the well-known advantages attached to this system, possesses the quality long sought after: not only does the load remain suspended directly the hand chain is let go, but the speed of lowering can be controlled by pulling in the brake cord, and there is no danger of the load overpowering the brake, as



Axle Box Showing Jack Ready for Lifting.



Axle Box Showing Jack Extended.

Car Lifted by Two 5-Ton Jacks.

its power is always proportionate to the load. Of benders, this firm make a great variety, from the ordinary "Jim crow" for railway metals, to hydraulic and other benders, adapted to any section of tram rail or other bars. Their hydraulic car pit lifting jacks, forcing and wheel presses, drum pullers and armature pushers, and bushing presses, are very handy tools. This may also be said of their patent telescopic screw tramcar lifting jack (the use of which is shown in the accompanying illustrations), which can be run out to more than double its original height, while maintaining its stability. For instance, a 10-ton jack, measuring 8¼ in. high when down, can be extended to 18¾ in. when run out. A powerful tool is their "Duplex" iron punching and bonding press. The patent portable hydraulic bolt forcers, with weights ranging from 196 to 700 lb., exert a power of from 20 to 75 tons.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Year Ended. | Electric Traction Inaugurated. | System. | Line open (single track). | Borrowing Powers. | Borrowing Powers Exercised. | Unexhausted Borrowing Powers. | Total Capital Expenditure. | Capital Expenditure per Mile of Single Track. | Loans Outstanding. | Loans Repaid and Sinking Fund. | Depreciation, Renewal and Reserve Funds. | Gross Receipts. Traffic. | Other. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mls. Chs. | | | | | | | | | | | |
| Aberdeen | †May 31, 1913 | Dec., 1899 | E. | 27 66 | 350,000 | ... | ... | 350,590 | 12,599 | 192,660 | 157,929 | 143,468 | 79,125 | 1,041 | 80,166 |
| Accrington | †Mar. 31, 1913 | Aug., 1907 | ,, | 10 53 | 169,675 | 134,670 | 35,800 | 134,525 | 12,619 | 116,976 | 17,694 | 13,200 | 27,419 | 403 | 27,822 |
| Ashton-u-Lyne | *Mar. 25, 1912 | Aug., 1902 | ,, | 8 15 | 130,070 | 108,099 | 21,971 | 108,099 | 13,203 | 83,240 | 24,859 | 1,650 | 21,340 | 551 | 21,891 |
| Ayr | *May 15, 1912 | Sept., 1901 | ,, | 7 49 | 128,000 | 74,405 | 53,595 | 82,914 | 10,892 | 64,417 | 16,078 | 14,028 | 15,092 | 660 | 15,752 |
| Birmingham | †Mar. 31, 1913 | Jan., 1904 | ,, | 108 32 | 2,302,001 | 2,089,194 | 212,807 | 1,981,588 | 18,280 | 1,874,109 | 215,084 | 220,369 | 574,248 | 7,318 | 581,566 |
| Blackburn | †Mar. 25, 1913 | Mar., 1899 | ,, | 24 63 | 408,174 | 342,474 | 65,700 | 334,924 | 13,512 | 254,600 | 167,381 | 1,000 | 63,440 | 3,243 | 66,683 |
| Blackpool | *Mar. 31, 1912 | June, 1899 | ,, | 21 31 | 438,028 | 294,483 | 143,545 | 295,984 | 13,839 | 294,483 | 102,855 | 16,259 | 64,313 | 1,027 | 65,340 |
| Bolton | †Mar. 31, 1913 | Dec., 1899 | ,, | 47 17 | 552,208 | 551,019 | 1,189 | 559,107 | 11,842 | 338,439 | 162,580 | 55,901 | 135,149 | 1,313 | 136,462 |
| Bradford | *Mar. 31, 1912 | July, 1898 | ,, | (h)101 74 | 1,269,568 | 978,063 | 291,505 | 965,366 | 9,471 | 635,883 | 355,633 | 75,120 | 274,328 | 15,007 | 289,335 |
| Brighton | †Mar. 31, 1913 | Nov., 1901 | ,, | 17 15 | 358,620 | 279,000 | 80,715 | 277,914 | 16,170 | 223,556 | 55,653 | 6,708 | 51,780 | 2,018 | 53,798 |
| Burnley | †Mar. 31, 1913 | Dec., 1901 | ,, | 22 13 | 388,052 | 339,125 | 48,927 | 231,601 | 10,450 | 179,498 | 56,652 | 48,212 | 79,641 | 249 | 79,890 |
| Burton-on-Trent | †Mar. 31, 1913 | Aug., 1903 | ,, | 9 60 | 108,632 | 104,562 | 4,070 | 106,225 | 10,895 | 50,583 | 53,979 | 8,966 | 14,383 | 1,304 | 15,687 |
| Bury | †Mar. 31, 1913 | June, 1903 | ,, | 21 14 (b)13 21 | 407,800 | 280,775 | 127,025 | 283,005 | 13,365 | 262,135 | 42,877 | (l)24,571 | 67,370 | 284 | 67,654 |
| Chester | *Mar. 25, 1912 | April, 1903 | ,, | 6 35 | 92,991 | 82,380 | 10,611 | 82,934 | 12,883 | 71,027 | 11,490 | 1,998 | 12,343 | 477 | 12,820 |
| Chesterfield | *Mar. 31, 1912 | Dec., 1904 | ,, | 5 8 | 95,000 | 70,500 | 24,500 | 69,575 | 13,642 | 60,289 | 10,211 | 5,031 | 11,709 | 496 | 12,205 |
| Colchester | †Mar. 31, 1913 | July, 1904 | ,, | 7 75 | 70,748 | 69,555 | 1,193 | 69,401 | 8,743 | 53,425 | 17,049 | Nil. | 10,281 | 477 | 10,758 |
| Croydon | †Mar. 31, 1913 | June, 1906 | ,, | 19 10 | 287,689 | 287,689 | Nil | 284,847 | 14,894 | 230,968 | 87,264 | 42,453 | 90,543 | 1,921 | 92,464 |
| Darlington | †Mar. 31, 1913 | June, 1904 | ,, | 8 71 | 107,500 | 76,263 | 31,237 | 76,322 | 8,587 | 56,888 | 19,434 | 5,726 | 11,842 | 334 | 12,176 |
| Darwen | *Mar. 31, 1912 | Oct., 1900 | ,, | 7 13 | 93,400 | 86,300 | 7,100 | 85,748 | 11,972 | 60,670 | 25,718 | 6,400 | 14,530 | 241 | 14,771 |
| Derby | *Mar. 31, 1912 | July, 1904 | E. | 22 5 | ... | ... | ... | 242,476 | 10,999 | 191,798 | 50,678 | (a)4,005 | E 46,388 | 975 | 47,363 |
| | | | H. | | ... | ... | ... | ... | ... | ... | ... | ... | H 407 | 18 | 425 |
| Doncaster | *Mar 31, 1912 | June, 1902 | E. | 11 62 | 103,900 | 94,500 | 9,400 | 95,025 | 8,070 | 82,400 | 13,020 | 27 | 17,417 | 252 | 17,669 |
| Dundee | *May 15, 1912 | July, 1900 | ,, | 27 38 | ... | 341,416 | ... | 349,854 | 12,734 | 266,161 | 77,173 | 60,984 | 62,016 | 664 | 62,680 |
| East Ham | *Mar. 31, 1912 | June, 1901 | ,, | 14 32 | 189,524 | 187,073 | 2,451 | ... | 191,260 | .. | 50,374 | ... | 57,342 | 668 | 58,010 |
| Exeter | †Mar. 31, 1913 | April, 1905 | ,, | 7 0 | 106,000 | 86,111 | 19,889 | 86,111 | 12,301 | 69,376 | 17,209 | 5,915 | 16,748 | Nil | 16,748 |
| Gloucester | *Mar 31, 1912 | April, 1904 | ,, | 15 2 | 191,000 | 144,243 | 46,757 | 147,692 | 9,846 | 113,280 | 14,587 | ... | 15,894 | 1,108 | 17,002 |
| Halifax | †Mar. 31, 1913 | June, 1898 | ,, | 54 70 | 449,263 | 412,876 | 36,387 | 414,246 | 7,549 | 299,480 | 105,948 | 27,379 | 104,947 | 1,026 | 105,973 |
| Ilford | *Mar. 31, 1912 | Mar., 1903 | ,, | 11 28 | 149,633 | 149,633 | Nil | 149,136 | 13,140 | 114,806 | 34,827 | 7,648 | 27,294 | 2,272 | 29,566 |
| Ilkeston | *Mar. 31, 1912 | May, 1903 | ,, | 4 24 | 64,214 | 47,000 | 15,074 | 47,936 | 11,148 | 42,600 | 11,919 | 350 | 6,533 | 156 | 6,689 |
| Ipswich | †Mar. 31, 1913 | Nov., 1903 | ,, | 14 70 | 116,471 | 114,300 | 2,171 | 114,838 | 7,720 | 98,858 | 16,305 | 8,180 | 22,575 | 829 | 23,404 |
| Keighley | *Mar. 31, 1912 | Oct., 1904 | ,, | 6 9 | 50,934 | 46,903 | 4,031 | 46,903 | 7,675 | 34,465 | 15,080 | 1,310 | 9,588 | 251 | 9,839 |
| Kilmarnock | *May 15, 1912 | Dec., 1904 | ,, | 5 47 | 65,000 | 48,246 | 16,754 | 52,666 | 9,426 | 48,205 | 6,090 | 2,749 | 8,400 | 237 | 8,637 |
| Kirkcaldy | †May 15, 1913 | Feb., 1903 | ,, | 8 45 | 213,000 | 96,748 | 116,252 | 96,749 | 11,025 | 80,333 | 16,415 | 4,161 | 15,712 | 494 | 16,206 |
| Lancaster | †Mar. 31, 1913 | Jan., 1903 | ,, | 4 65 | 60,000 | 51,550 | 8,450 | 43,432 | 9,022 | 36,200 | 13,838 | 3,000 | 5,437 | 143 | 5,580 |
| Leith | *May 15, 1912 | Aug., 1905 | ,, | 17 73 | 275,000 | 235,000 | 40,000 | 235,000 | 13,119 | 193,200 | 42,257 | 302 | 33,851 | 842 | 34,693 |
| Leyton | *Mar. 31, 1912 | Dec., 1906 | ,, | 18 40 | 306,427 | 305,821 | 606 | 295,526 | 15,977 | 256,643 | 40,906 | 3,360 | 61,496 | 1,172 | 62,668 |
| Lincoln | †Mar. 31, 1913 | Nov., 1905 | S. | 2 77 | 98,519 | 44,947 | 53,572 | 44,992 | 15,187 | 42,893 | 9,862 | (a) 1,600 | 6,717 | 128 | 6,845 |
| Liverpool | *Dec. 31, 1912 | Nov., 1898 | E. | 119 0 | ... | ... | ... | 2,015,193 | 16,934 | 1,245,282 | 1,012,873 | 430,509 | 631,071 | 13,103 | 644,174 |
| Lowestoft | *Sep. 30, 1912 | July, 1903 | ,, | 4 6 | 94,230 | 87,031 | 7,199 | 87,031 | 21,357 | 67,833 | 13,067 | ... | 10,781 | 17 | 10,798 |
| Maidstone | *Mar. 31, 1912 | July, 1904 | ,, | 7 3 | 82,932 | 82,582 | 350 | 78,748 | 11,012 | 69,158 | 13,424 | Nil. | 9,279 | 518 | 9,797 |
| Manchester | †Mar. 31, 1913 | June, 1901 | ,, | 188 30 | 2,355,689 | 2,034,371 | 321,318 | 2,061,791 | 10,945 | 1,543,504 | 437,305 | 479,683 | 876,023 | 11,624 | 887,647 |
| Nelson | †Mar. 31, 1913 | Feb., 1903 | ,, | 3 69 | 38,000 | 37,832 | 168 | 37,832 | 9,795 | 30,118 | 7,714 | ... | 10,240 | 51 | 10,291 |
| Newport (Mon.) | †Mar. 31, 1913 | April, 1903 | ,, | 14 28 | 219,250 | 196,250 | 23,000 | 193,191 | 13,463 | 164,763 | 31,487 | 9,035 | 37,555 | 995 | 38,550 |
| Nottingham | †Mar. 31, 1913 | Jan., 1901 | ,, | 37 40 | 730,300 | 725,945 | 4,355 | 638,005 | 17,479 | 426,818 | 217,041 | 64,242 | 164,746 | 2,404 | 167,150 |
| Oldham | *Mar. 25, 1912 | May, 1902 | ,, | 27 67 (b) 8 31 | 516,925 | 436,704 | 80,219 | 441,047 | 15,395 | 333,746 | 113,339 | (a) 1,419 | 101,280 | 819 | 102,099 |
| Perth | *May 15, 1912 | Nov., 1905 | ,, | 6 40 | 90,000 | 77,650 | 12,350 | 77,829 | 11,539 | 64,790 | 13,678 | 1,034 | 9,689 | 412 | 10,101(e) |
| Plymouth | *Mar. 31, 1912 | Sept., 1899 | ,, | 15 0 | ... | 188,752 | ... | 157,322 | ... | 92,636 | 97,320 | 10,848 | 37,083 | 830 | 37,913 |
| Pontypridd | *Mar. 31, 1912 | Mar., 1905 | ,, | 8 48 | 136,019 | 135,885 | 134 | 136,896 | 15,919 | 112,862 | 22,899 | ... | 21,130 | 2,036 | 23,166 |
| Rawtenstall | *Mar. 31, 1912 | May, 1909 | ,, | 15 71 | 196,159 | 182,933 | 13,226 | 181,036 | 11,401 | 169,971 | 12,962 | 2,150 | 24,063 | 1,018 | 25,081 |
| Rochdale | *Mar. 31, 1912 | May, 1902 | ,, | (i) 40 2 | 356,991 | 347,782 | 9,209 | 351,831 | 15,347 | 347,782 | 71,729 | ... | 72,649 | 353 | 73,002 |
| Rotherham | *Mar. 31, 1912 | Jan., 1903 | ,, | 12 0 | 228,550 | 155,000 | 73,550 | 154,589 | 12,882 | 132,835 | 46,413 | 18,123 | 35,724 | 133 | 35,857 |
| Salford | *Mar. 31, 1912 | Oct., 1901 | ,, | 75 0 | 1,050,666 | 723,669 | 326,997 | 723,324 | 9,644 | 581,149 | 237,090 | 48,964 | 253,962 | 70 | 254,032 |
| Southampton | *Mar. 31, 1912 | Jan., 1900 | ,, | 17 62 | 277,259 | 239,715 | 37,544 | 247,977 | 13,951 | 169,010 | 70,726 | 18,497 | 63,849 | 2,260 | 66,109 |
| Southend-on-Sea | †Mar. 31, 1913 | July, 1901 | ,, | 11 49 | 130,000 | 129,961 | 39 | 143,808 | 12,384 | 116,940 | 12,784 | 3,045 | 34,453 | 465 | 34,918 |
| Southport | Mar. 31, 1912 | July, 1900 | ,, | (d) 10 63 | 292,000 | 196,500 | 95,500 | 118,708 | 11,004 | ... | .. | 417 | 18,642 | 402 | 19,044 |
| South Shields | †Mar. 31, 1913 | Mar., 1906 | ,, | 10 21 | 251,883 | 174,936 | 76,947 | 172,476 | 16,806 | 150,228 | 30,818 | 20,833 | 33,654 | 498 | 34,152 |
| Staly'ge, H., & D. | †Mar 31, 1913 | May, 1904 | ,, | 27 57 | 325,270 | 274,990 | 44,280 | 279,778 | 10,096 | 224,700 | 56,290 | 500 | 34,961 | 677 | 35,638 |
| Stockport | *Mar. 31, 1912 | Aug., 1902 | ,, | 27 50 | 305,028 | 234,500 | 70,528 | 238,199 | 8,623 | 176,002 | 58,498 | 54,219 | 59,594 | 1,245 | 60,839 |
| Sunderland | †Mar. 31, 1913 | Aug., 1900 | ,, | 20 28 | 308,699 | 303,211 | 5,488 | 305,234 | 14,999 | 182,318 | 111,943 | 31,883 | 68,507 | 364 | 68,871 |
| Wallasey | *Mar. 31, 1912 | Mar., 1902 | ,, | 19 69 | 192,546 | 191,249 | 1,297 | 210,671 | 10,606 | 167,586 | 53,395 | 10,544 | 57,337 | 770 | 58,107 |
| Walsall | *Dec. 31, 1912 | Dec., 1902 | ,, | 19 44 | 188,145 | 188,100 | 45 | 183,351 | 9,378 | 156,161 | 31,939 | 30,879 | 30,629 | 800 | 31,429 |
| Walthamstow | *Mar 31, 1912 | June, 1905 | ,, | 12 42 | 180,000 | 180,000 | Nil | 173,081 | 13,846 | 165,679 | 16,321 | 2,757 | 38,249 | 741 | 38,990 |
| Warrington | †Mar. 31, 1913 | April, 1902 | ,, | 9 52 | 103,674 | 102,896 | 778 | 102,128 | 10,583 | 73,830 | 29,068 | 10,000 | 22,903 | 302 | 23,205 |
| West Ham | †Mar. 31, 1913 | Feb., 1904 | ,, | 30 4 | 563,478 | 551,463 | 12,015 | 556,878 | 18,532 | 539,650 | 90,402 | 40,352 | 137,766 | 676 | 138,442 |
| Wigan | †Mar. 31, 1913 | April, 1901 | ,, | (k) 34 42 | ... | ... | ... | ... | ... | ... | ... | ... | 71,268 | 1,515 | 72,783 |
| Wolverhampton | †Mar. 31, 1913 | April, 1902 | S. | 21 40 | 279,733 | 265,616 | 14,117 | 278,615 | 12,959 | 217,882 | 47,734 | 50,220 | 53,963 | 797 | 54,760 |
| Yarmouth (Gt.) | †Mar. 31, 1913 | June, 1902 | E. | 14 32 | 144,500 | 119,750 | 24,750 | 121,899 | 8,465 | 111,450 | 22,737 | 6,070 | 23,625 | 508 | 24,133 |

## TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | †Mar. 31, 1913 | Nov., 1905 | E. | 98 54 | 1,567,674 | 1,386,232 | 181,442 | 1,389,715 | 14,037 | 1,381,200 | 144,342 | 117,769 | 250,589 | 3,788 | 254,377 |
| Bexley | *Mar. 31, 1912 | Oct., 1903 | ,, | 6 42 | 99,942 | 96,984 | 2,958 | 96,924 | 14,854 | 78,800 | 18,184 | (j) 1,074 | 13,826 | 1,542 | 15,368 |
| Birkenhead | †Mar. 31, 1913 | Feb., 1901 | ,, | 24 7 | 375,848 | 364,854 | 10,994 | 366,610 | 15,220 | 247,012 | 117,863 | 18,070 | 61,202 | 4,365 | 65,567 |
| Bournemouth | *Mar. 31, 1912 | July, 1902 | ,, | (e) 29 62 | 449,027 | 434,462 | 14,565 | 438,194 | 19,601 | 341,688 | 113,617 | 5,656 | 91,422 | 233 | 91,655 |
| Cardiff | *Mar. 31, 1912 | May, 1902 | ,, | 31 66 | 813,923 | 787,292 | 26,631 | 783,051 | 24,683 | 583,869 | 203,422 | 86,411 | 125,743 | 19,181 | 144,924 |
| Glasgow | †May 31, 1913 | Oct., 1898 | ,, | 193 47 (b) 2 52 | 3,714,266 | 3,553,584 | 160,682 | 3,694,143 | 18,595 | 2,479,408 | 1,074,177 | 2,079,645 | 1,007,653 | 3,891 | 1,011,544 |
| Huddersfield | †Mar. 31, 1913 | Feb., 1901 | ,, | 46 0 | 646,284 | 407,142 | 239,142 | 417,408 | 9,074 | 255,177 | 161,349 | 19,132 | 106,586 | 3,123 | 109,709 |
| Hull | †Mar. 31, 1913 | July, 1899 | ,, | 30 44 | 677,673 | 541,871 | 135,802 | 542,371 | 17,753 | 527,641 | 147,925 | 125,407 | 157,048 | 1,393 | 158,441 |
| Leeds | †Mar. 31, 1913 | Aug., 1897 | ,, | 112 62 | 1,603,455 | 1,546,422 | 57,033 | 1,511,588 | 13,406 | 1,220,041 | 482,698 | 4,637 | 407,552 | 3,979 | 411,531 |
| Leicester | *Dec. 31, 1912 | May, 1904 | ,, | 37 0 | 739,240 | 719,223 | 20,017 | 722,021 | 19,514 | 607,476 | 129,211 | 100,000 | 134,966 | 12,705 | 147,671 |
| London | *Mar. 31, 1912 | ... | H. | 23 30 | | | | | | | | | 60,357 | 1,335 | 61,692 |
| | | May, 1903 | C.E | 255 60 | (c) | (c) | (c) | 11,850,127 | ... | 11,309,789 | 2,423,040 | 920,402 | 2,231,902 | 62,587 | 2,294,489 |
| N'castle-on-Tyne | *Mar. 31, 1912 | Dec., 1901 | E. | 60 20 | 1,520,425 | 1,199,962 | 320,463 | 1,176,339 | 19,574 | 932,552 | 342,271 | 104,670 | 216,590 | 10,044 | 226,634 |
| Northampton | †Mar. 31, 1913 | July, 1904 | ,, | 9 13 | 239,800 | 127,255 | 112,545 | 135,481 | 14,786 | 91,176 | 36,078 | 10,499 | 27,250 | 899 | 28,149 |
| Portsmouth | *Mar. 31, 1912 | Sep., 1901 | ,, | 30 66 | 640,011 | 682,319 | ... | 696,792 | 22,599 | 471,739 | 210,580 | 85,307 | 110,792 | 1,810 | 112,602 |
| Preston | *Mar. 31, 1912 | June, 1904 | ,, | 17 16 | 224,101 | 187,269 | 36,832 | 187,269 | 10,888 | 129,765 | 37,200 | 31,466 | 40,355 | 292 | 40,647 |
| Reading | *Mar. 31, 1912 | July, 1903 | ,, | 13 14 | 235,000 | 232,000 | 3,000 | 227,430 | 17,262 | 174,040 | 51,582 | 14,651 | 33,151 | 1,119 | 34,270 |
| Sheffield | †Mar. 25, 1913 | Sep., 1899 | ,, | 77 67 | 1,727,596 | 1,413,980 | 313,616 | 1,411,959 | 18,140 | 1,067,897 | 418,292 | 27,521 | 358,656 | 3,189 | 361,845 |
| Wellington, N.Z. | †Mar. 31, 1913 | ... | ,, | 30 7 | 496,423 | 496,423 | Nil | 606,771 | 20,165 | 496,423 | 39,486 | 109,066 | 149,446 | 826 | 150,272 |

C = Electric conduit system. E = Electric trolley system. H = Horse lines. S = Surface contact system. (a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed (d) Car depot extensions. (e) Includes 7 mi. 34·53 chs. single track lines leased. (g) District fund widening streets. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased. (j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance. (m) Includes £306 profit on motor char-a-banc. † Reports inserted for the financial year 1912-13.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Working Expenses. | | | | | Gross Profit on Working. | Additions to Gross Profit. | Deductions from Gross Profit. | | | | | Net Surplus + or Deficit − |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traffic. | General. | Repairs & Maintenance. | Power. | Total. | | | Interest. | Sinking Fund. | Income Tax. | Depreciation & Renewal. | Sundries. | Total. | |
| Aberdeen | 20,710 | 9,404 | 5,954 | 7,138 | 43,206 | 36,960 | 472 | 6,839 | 4,661 | ... | 13,407 | ... | 24,907 | + 12,525 |
| Accrington | 6,839 | 1,870 | 2,102 | 4,644 | 15,455 | 12,367 | ... | 4,000 | 3,693 | 127 | ... | ... | 7,820 | + 4,553 |
| Ashton-und-Lyne | 4,699 | 1,715 | 2,358 | 3,225 | 11,997 | 9,894 | ... | 2,814 | 3,536 | 440 | 750 | †1,004 | 8,544 | + 1,350 |
| Ayr | 3,403 | 1,959 | 1,383 | 1,925 | 8,670 | 7,082 | ... | 2,100 | 1,669 | 132 | 1,966 | 128 | 5,995 | + 1,249 |
| Birmingham | 160,277 | 40,898 | 68,278 | 100,726 | 370,179 | 211,387 | 11,479 | 65,672 | 49,946 | ... | ... | 5,896 | 121,514 | +101,352 |
| Blackburn | 14,863 | 4,262 | 12,392 | 10,999 | 42,516 | 24,167 | 110 | 5,292 | 14,909 | 206 | ... | ... | 20,407 | + 3,870 |
| Blackpool | 14,325 | 4,758 | 12,889 | 8,262 | 40,234 | 25,106 | ... | (h) 8,721 | 6,332 | ... | 5,053 | ... | 20,106 | + 5,000 |
| Bolton | 29,821 | 8,646 | 15,984 | 19,767 | 74,218 | 62,244 | 1,114 | (h) 11,189 | 17,197 | 1,095 | 18,715 | 219 | 48,415 | + 14,943 |
| Bradford | 76,831 | 22,521 | 36,739 | 44,044 | 180,135 | 109,200 | 3,279 | 20,965 | 31,144 | 2,894 | 30,783 | 4,693 | 90,479 | + 22,000 |
| Brighton | 14,309 | 4,028 | 12,853 | 8,316 | 39,506 | 14,292 | 27 | 7,800 | 5,560 | ... | 27 | ... | 13,360 | + 932 |
| Burnley | 18,718 | 5,306 | 9,525 | 15,881 | 49,430 | 30,460 | ... | 5,662 | 6,491 | 893 | ... | (f) 2,873 | 15,919 | + 14,541 |
| Burton-on-Trent | 5,111 | 1,322 | 2,903 | 2,998 | 12,334 | 3,353 | ... | 1,406 | 1,418 | ... | 1,500 | ... | 4,324 | − 971 |
| Bury | 14,761 | 4,349 | 6,633 | 8,026 | 33,769 | 33,885 | 337 | (h) 7,974 | 4,824 | 244 | ... | (w) 11,608 | 24,650 | + 9,572 |
| Chester | 3,278 | 1,598 | 828 | 2,248 | 7,952 | 4,868 | 95 | (h) 2,773 | 1,018 | ... | 1,172 | ... | 4,963 | ... |
| Chesterfield | 2,712 | 1,166 | 1,469 | 2,019 | 7,366 | 4,839 | 219 | 2,426 | 1,799 | ... | ... | ... | 4,225 | + 833 |
| Colchester | 2,825 | 1,189 | 1,771 | 2,508 | 8,293 | 2,465 | 48 | (h) 2,159 | 2,319 | ... | ... | ... | 4,478 | − 1,965 |
| Croydon | 29,571 | 6,806 | 13,300 | 16,541 | 66,218 | 26,246 | 907 | 7,994 | 7,428 | 1,145 | ... | ... | 16,567 | + 10,586 |
| Darlington | 4,192 | 762 | 1,912 | 1,945 | 8,811 | 3,365 | 102 | 2,010 | 1,966 | 105 | 404 | 59 | 4,544 | − 1,077 |
| Darwen | 3,448 | 754 | 2,627 | 2,232 | 9,061 | 5,710 | 111 | 2,314 | 2,186 | ... | 1,050 | ... | 5,550 | + 271 |
| Derby | E 16,132<br>H 558 | 2,434<br>... | 4,428<br>55 | 9,026<br>... | 32,020<br>613 | 15,343<br>def. 188 | 266 | 6,944 | 3,274 | ... | ... | (l) 208 | 10,426 | + 5,183 |
| Doncaster | 4,071 | 940 | 4,325 | 3,918 | 13,254 | 4,415 | 186 | 2,744 | 1,309 | ... | 107 | 441 | 4,601 | ... |
| Dundee | 16,160 | 4,963 | 7,262 | 10,999 | 39,384 | 23,296 | ... | 8,635 | 5,950 | 217 | 6,902 | 546 | 22,250 | + 1,046 |
| East Ham | 16,218 | 6,024 | 10,014 | 9,415 | 41,671 | 16,339 | ... | (h) 5,846 | 6,555 | ... | 517 | 85 | 13,003 | + 3,336 |
| Exeter | 4,511 | 1,175 | 1,311 | 3,499 | 10,496 | 6,252 | ... | (h) 2,347 | 1,814 | 48 | ... | ... | 4,209 | + 2,043 |
| Gloucester | 6,346 | 1,593 | 2,358 | 1,991 | 12,288 | 4,714 | ... | 4,813 | 2,218 | ... | ... | ... | 7,031 | − 2,317 |
| Halifax | 27,116 | 8,306 | 15,263 | 18,976 | 69,661 | 36,312 | 51 | 10,159 | 10,562 | ... | 6,701 | 1,760 | 29,182 | + 7,181 |
| Ilford | 8,930 | 2,010 | 4,838 | 4,664 | 20,442 | 9,124 | 557 | 4,315 | 4,725 | ... | 641 | ... | 9,681 | ... |
| Ilkeston | 2,359 | 579 | 1,613 | 1,476 | 6,027 | 662 | 157 | 1,578 | 1,644 | ... | ... | 210 | 3,432 | − 2,613 |
| Ipswich | 8,072 | 1,827 | 4,015 | 3,502 | 17,416 | 5,988 | ... | (h) 3,642 | 2,078 | ... | ... | ... | 5,720 | + 268 |
| Keighley | 2,769 | 724 | 940 | 1,551 | 5,984 | 3,855 | 224 | 1,160 | 1,815 | ... | ... | (n) 1,104 | 4,079 | ... |
| Kilmarnock | 3,271 | 774 | 988 | 1,754 | 6,787 | 1,850 | 7 | (h) 1,637 | 1,238 | 2 | 1,160 | ... | 4,037 | − 2,180 |
| Kirkcaldy | 4,728 | 1,158 | 1,525 | 2,636 | 10,047 | 6,159 | ... | 2,660 | 1,608 | ... | 410 | 110 | 4,788 | + 1,370 |
| Lancaster | 2,237 | 474 | 872 | 1,621 | 5,204 | 376 | 80 | 1,243 | 1,467 | ... | ... | ... | 2,710 | − 2,254 |
| Leith | 9,057 | 2,439 | 3,588 | 3,147 | 18,231 | 16,462 | 86 | (h) 6,566 | 7,750 | ... | ... | 139 | 14,455 | + 2,093 |
| Leyton | (p) 16,573 | 5,056 | 8,211 | 11,672 | 41,512 | 21,156 | ... | 10,340 | 7,596 | ... | 1,478 | 264 | 19,678 | + 1,478 |
| Lincoln | 1,478 | 625 | 989 | 925 | 4,017 | 2,828 | 153 | 1,529 | 1,071 | ... | ... | ... | 2,600 | + 381 |
| Liverpool | 167,045 | 58,771 | 80,184 | 113,893 | 419,893 | 224,281 | 24,045 | 50,096 | 59,155 | ... | (d) 66,929 | (e) 5,217 | 181,397 | + 66,929 |
| Lowestoft | 3,285 | 796 | 2,115 | 2,813 | 9,009 | 1,789 | .. | (h) 2,261 | 1,562 | ... | ... | 350 | 4,173 | − 2,384 |
| Maidstone | 2,324 | 1,077 | 1,139 | 1,868 | 6,408 | 3,369 | 58 | (h) 2,797 | 2,185 | ... | ... | 74 | 5,056 | − 1,609 |
| Manchester | 255,604 | 83,574 | 84,879 | 133,681 | 557,738 | 329,909 | 14,282 | 55,771 | 52,394 | 8,613 | 96,351 | (e) 31,062 | 244,191 | +100,000 |
| Nelson | 2,425 | 677 | 1,320 | 2,006 | 6,428 | 3,863 | ... | 1,008 | 966 | ... | ... | ... | 1,974 | + 1,899 |
| Newport (Mon.) | 10,254 | 4,009 | 10,364 | 7,044 | 31,671 | 6,879 | 808 | 5,817 | 4,197 | ... | ... | ... | 10,014 | − 2,327 |
| Nottingham | 43,601 | 15,142 | 18,684 | 30,847 | 108,274 | 58,886 | ... | 14,349 | 19,762 | ... | ... | ... | 34,111 | + 24,775 |
| Oldham | 25,086 | 6,931 | 17,077 | 22,090 | 71,184 | 30,915 | 1,369 | 15,448 | 11,501 | 1,636 | ... | (k) 6,112 | 34,697 | − 2,413 |
| Perth | 3,795 | 680 | 450 | 1,347 | 6,272 | 3,829 | 45 | 2,332 | 2,006 | 2 | 640 | 51 | 5,031 | − 1,157 |
| Plymouth | 7,933 | 3,542 | 5,029 | 7,577 | 24,081 | 13,832 | 1,258 | 4,778 | 3,931 | ... | 3,354 | ... | 12,063 | + 3,027 |
| Pontypridd | 5,307 | 1,469 | 6,611 | 3,656 | 17,043 | 6,123 | 5 | (h) 4,293 | 4,034 | ... | 590 | 41 | 8,958 | − 2,830 |
| Rawtenstall | 5,292 | 2,216 | 2,049 | 3,958 | 13,515 | 11,566 | (q) 1,663 | 6,148 | 5,531 | ... | ... | ... | 11,679 | + 1,550 |
| Rochdale | 16,421 | 4,475 | 6,944 | 9,527 | 37,367 | 35,635 | 246 | 11,380 | 9,594 | 694 | ... | (z) 7,727 | 29,395 | + 6,486 |
| Rotherham | 8,991 | 2,539 | 5,187 | 8,497 | 25,214 | 10,643 | 944 | 4,393 | 2,757 | ... | 3,707 | ... | 10,837 | + 750 |
| Salford | 67,947 | 16,384 | 24,721 | 47,166 | 156,218 | 97,814 | 5,158 | 19,550 | 23,846 | 2,295 | 9,569 | (k) 29,712 | 84,972 | + 18,000 |
| Southampton | 17,703 | 4,879 | 8,782 | 12,454 | 43,818 | 22,291 | 6,099 | 6,779 | 6,578 | 574 | ... | 488 | 14,419 | + 13,971 |
| Southend-on-Sea | 8,046 | 2,260 | 3,534 | 6,187 | 20,027 | 14,891 | 4,228 | (k) 3,834 | 1,753 | ... | 4,017 | ... | 9,605 | + 9,514 |
| Southport | 4,836 | 2,004 | 2,801 | 3,470 | 13,111 | 5,933 | 6,370 | 11,525 | ... | ... | 2,738 | ... | 14,263 | − 1,960 |
| South Shields | 7,929 | 3,263 | 2,659 | 5,370 | 19,221 | 14,931 | 313 | (h) 5,488 | 3,438 | ... | ... | ... | 8,926 | + 6,318 |
| Staly'dge, H., M., D. | 12,148 | 4,018 | 6,273 | 6,445 | 28,884 | 6,754 | ... | (h) 7,711 | 7,308 | ... | 327 | 532 | 15,878 | − 9,124 |
| Stockport | 12,436 | 3,717 | 6,437 | 4,781 | 27,371 | 33,468 | 1,326 | 5,978 | 8,363 | 910 | 6,795 | 3,208 | 25,254 | + 9,540 |
| Sunderland | 18,431 | 4,552 | 4,670 | 11,268 | 38,921 | 29,950 | 252 | (h) 7,228 | 10,366 | 476 | 7,132 | ... | 25,202 | + 5,000 |
| Wallasey | 16,074 | 4,027* | 5,281 | 12,979 | 38,361 | 19,746 | 474 | 6,270 | 4,383 | ... | 2,500 | 633 | 13,786 | + 6,434 |
| Walsall | 7,155 | 3,034 | 4,126 | 3,913 | 18,228 | 13,201 | 1,334 | 5,164 | 3,577 | 415 | 368 | 1,119 | 10,643 | + 3,892 |
| Walthamstow | 13,413 | 2,547 | 5,204 | 7,423 | 28,587 | 10,403 | 210 | (h) 6,214 | 2,599 | ... | ... | ... | 8,813 | + 1,800 |
| Warrington | 5,529 | 1,779 | 4,255 | 3,235 | 14,798 | 8,407 | 408 | 2,580 | 3,254 | ... | ... | ... | 5,834 | + 2,981 |
| West Ham | 51,254 | 11,253 | 26,921 | 19,386 | 108,814 | 29,628 | 508 | 19,511 | 12,369 | 685 | ... | 959 | 33,524 | − 3,388 |
| Wigan | ... | ... | ... | ... | 41,318 | 31,465 | ... | 13,859 | 12,391 | ... | ... | 3,781 | ... | ... |
| Wolverhampton | 12,259 | 4,157 | 7,334 | 6,778 | 30,528 | 24,232 | (x) 1,131 | 7,788 | 5,146 | 100 | 4,915 | (a) 3,637 | 21,586 | + 3,777 |
| Yarmouth (Gt.) | 7,443 | 1,867 | 2,634 | 4,388 | 16,332 | 7,801 | 95 | (h) 4,094 | 2,740 | ... | ... | ... | 6,834 | + 1,062 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | 73,836 | 13,642 | 32,519 | 23,887 | 143,884 | 110,492 | 1,363 | 45,900 | 24,541 | 2,023 | 13,000 | 1,628 | 87,092 | + 24,763 |
| Bexley | (s) 5,465 | 984 | 1,892 | 920 | 9,261 | 6,107 | ... | 2,942 | 2,325 | ... | 500 | ... | 5,767 | + 340 |
| Birkenhead | 16,099 | 4,011 | 10,380 | 9,371 | 39,861 | 25,706 | 86 | (h) 11,537 | 9,501 | 269 | 4,302 | 183 | 25,792 | ... |
| Bournemouth | 22,385 | 7,624 | 11,045 | 13,787 | 54,841 | 36,814 | 838 | 10,852 | 15,521 | ... | ... | (c) 7,900 | 34,273 | + 3,379 |
| Cardiff | 37,145 | (c) 10,512 | 14,894 | 17,223 | 79,774 | 65,150 | 1,529 | 24,327 | 23,079 | 750 | 6,947 | ... | 55,103 | + 11,576 |
| Glasgow | 305,400 | 122,812 | 142,988 | 48,147 | 619,347 | 392,197 | 58,631 | 81,774 | 97,077 | 13,388 | 215,757 | 9,829 | 417,825 | + 33,003 |
| Huddersfield | 26,892 | 6,064 | 22,638 | 9,933 | 65,527 | 44,182 | 61 | (h) 11,749 | 10,904 | 1,630 | ... | ... | 24,283 | + 19,960 |
| Hull | 47,495 | 12,212 | 42,005 | 11,245 | 112,957 | 45,484 | 1,500 | 16,730 | 12,201 | 1,500 | (u) 3,118 | ... | 33,549 | + 13,435 |
| Leeds | 109,413 | 36,055 | 39,894 | 28,455 | 213,817 | 197,714 | 7,511 | 42,197 | 49,923 | 5,021 | 41,752 | 4,957 | 143,850 | + 61,375 |
| Leicester | 47,876 | 9,497 | 22,023 | 15,633 | 95,029 | 52,642 | 2,512 | 23,252 | 12,095 | 1,939 | 7,668 | ... | 44,954 | + 10,000 |
| London | H 28,811<br>E 696,620 | 4,371<br>(r) 188,382 | 7,782<br>295,669 | (m) 32,694<br>167,639 | 73,658<br>1,348,310 | def. 11,966<br>946,179 | ...<br>29,440 | 334,173 | 369,356 | 22,858 | 138,152 | (l) 26,529 | 891,068 | + 84,551 |
| N'castle-on-Tyne | 60,663 | 17,730 | 29,951 | (g) 13,668 | 122,012 | 104,622 | 3,598 | 30,972 | 39,314 | 2,697 | 8,427 | (j) 13,368 | 94,778 | + 13,442 |
| Northampton | 7,254 | 3,080 | 2,489 | 3,563 | 16,386 | 11,763 | 279 | 3,481 | 4,312 | 323 | ... | (b) 1,226 | 9,342 | + 2,700 |
| Portsmouth | 28,392 | 9,780 | 9,225 | 4,482 | 51,879 | 60,723 | 2,677 | 20,798 | 17,458 | 1,109 | 8,694 | 1,273 | 49,332 | + 14,068 |
| Preston | 10,630 | 5,144 | 5,847 | 2,351 | 23,972 | 16,675 | ... | 4,324 | 4,749 | .. | ... | 1,361 | 10,434 | + 6,241 |
| Reading | 8,518 | 3,545 | 4,307 | 3,246 | 19,616 | 14,654 | ... | 6,626 | 4,662 | 162 | ... | ... | 11,450 | + 3,204 |
| Sheffield | 113,235 | 22,312 | 43,656 | 28,487 | 207,690 | 154,155 | 3,057 | 35,616 | 40,663 | 3,786 | 30,187 | 213 | 110,465 | + 46,748 |
| Wellington, N.Z. | 56,296 | 7,242 | 21,330 | 16,260 | 101,128 | 49,144 | 2,664 | 19,961 | 4,778 | ... | 14,068 | 4,702 | 43,509 | + 8,299 |

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,570 insurance fund. (d) Includes reserve. (e) Rents for leased lines. (f) £2,061 rent of leased lines. (g) Including street lighting. (h) Including income tax. (i) Accrued interest. (j) Including £12,250 commuted payment to Newcastle Electric Supply Company. (k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account. (o) Including £9,612 for lighting generation. (p) Includes £243 horse account. (q) Aid from rates £1,500. (r) Including special charges, £17,478. (s) Including £2,128 through-running expenses. (t) Car depot extensions. (u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc. (z) Includes £4,386 rent of leased lines. † This item includes £734 payable to Sinking Fund of Hurst U.D.C.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Appropriation of Net Surplus. | | | Receipts per Car Mile. | | Operating Expenses per Car Mile. | | | | | Percentage of Operating Expenses to Total Revenue. | Average Operating Expenses per Car Mile (excludi'g Power Cost). | Board of Trade Units. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carried Forward. | Reserve. | Contribution to Rates or Municip'l Funds. | Average Total per Car Mile. | Average Traffic per Car Mile. | Traffic. | General. | Repairs and Maintenance. | Power. (Price paid) | Total. | | | Units. | Cost per Unit. | Units used per car mile. |
| | | | | d. | d. | d. | d. | d. | d. | d. | % | d. | | d. | |
| Aberdeen ... | ... | 12,525 | ... | 11·06 | 10·92 | 2·859 | 1·298 | ·822 | ·985 | 5·964 | 53·89 | 4·979 | 2,110,964 | ·81 | 1·21 |
| Accrington ... | 460 | 3,359 | 724 | 12·57 | 12·38 | 3·09 | ·84 | ·95 | 2·10 | 6·98 | 55·55 | 4·88 | 907,721 | 1·24 | 1·70 |
| Ashton-u-Lyne ... | ... | ... | 1,350 | 11·475 | 11·186 | 2·463 | ·899 | 1·236 | 1·691 | 6·289 | 54·801 | 4·598 | 619,289 | 1·25 | 1·353 |
| Ayr... ... ... | ... | ... | 1,249 | 9·79 | 9·38 | 2·11 | 1·21 | ·86 | 1·19 | 5·39 | 55 | 4·19 | 374,296 | 1·24 | ·97 |
| Birmingham ... | ... | 45,000 | 56,352 | 10·62 | 10·492 | 2·929 | ·747 | 1·248 | 1·840 | 6·764 | 63·6 | 4·924 | 21,594,889 | 1·119 | 1·64 |
| Blackburn ... | 3,870 | ... | ... | 14·02 | 13·34 | 3·12 | ·90 | 2·61 | 2·31 | 8·94 | 56·84 | 6·63 | 2,030,535 | 1·3 | 1·81 |
| Blackpool ... | ... | ... | 5,000 | 16·63 | 16·37 | 3·65 | 1·21 | 3·28 | 2·10 | 10·24 | 61·57 | 8·14 | 1,238,641 | 1·60 | 1·31 |
| Bolton ... ... | 443 | ... | 14,500 | 11·558 | 11·447 | 2·525 | ·733 | 1·354 | 1·674 | 6·286 | 54·915 | 4·612 | 4,315,448 | 1·1 | 1·52 |
| Bradford ... ... | ... | ... | 22,000 | 12·211 | 11·600 | 3·398 | ·700 | 1·320 | 1·545 | 6·963 | 62·259 | 5·418 | 10,574,643 | 1 | 1·830 |
| Brighton ... ... | 932 | ... | ... | 11·545 | 11·112 | 3·071 | ·864 | 2·758 | 1·785 | 8·478 | 73·43 | 6·693 | 1,663,126 | 1·2 | 1·49 |
| Burnley ... ... | ... | 5,791 | 8,750 | 13·226 | 13·185 | 3·098 | ·878 | 1·577 | 2·630 | 8·183 | 61·85 | 5·55 | 3,079,155 | 1·214 | 2·11 |
| Burton-on-Trent | ... | ... | ... | 8·61 | 7·90 | 2·81 | ·73 | 1·45 | 1·42 | 6·41 | 78·7 | 4·99 | 515,622 | 1·39 | 1·01 |
| Bury ... ... | ... | (i) 4,572 | 5,000 | 10·22 | 10·04 | 2·214 | ·685 | 1·152 | 1·290 | 5·341 | 49·91 | 4·051 | 2,039,011 | 1·081 | 1·271 |
| Chester ... ... | ... | ... | ... | 8·84 | 8·51 | 2·26 | 1·10 | ·57 | 1·55 | 5·48 | 62 | 3·93 | 397,691 | ·764 | 1·14 |
| Chesterfield ... | ... | 833 | ... | 10·10 | 9·69 | 2·24 | ·96 | 1·22 | 1·68 | 6·1 | 59·6 | 4·43 | 387,704 | 1·25 | 1·3 |
| Colchester ... | ... | ... | ... | 7·98 | 7·627 | 2·096 | ·882 | 1·313 | 1·86 | 6·151 | 76·74 | 4·291 | 401,208 | 1·5 | 1·24 |
| Croydon ... ... | ... | 7,586 | 3,000 | 8·381 | 8·207 | 2·763 | ·637 | 1·224 | 1·499 | 6·123 | 70·91 | 4·497 | 2,484,993 | 1·604 | ·938 |
| Darlington ... | ... | ... | ... | 7·651 | 7·441 | 2·633 | ·480 | 1·202 | 1·222 | 5·537 | 72·36 | 4·315 | 466,784 | 1 | 1·222 |
| Darwen ... ... | 271 | ... | ... | 14·18 | 13·9 | 3·645 | ·708 | 2·224 | 2·507 | 9·084 | 61·3 | 6·55 | 421,503 | 1·313 | 1·68 |
| Derby ... ... | 5,183 | ... | ... | E 9·79<br>H. 5·70 | 9·50<br>5·47 | 3·33<br>7·49 | ·50<br>... | ·92<br>·74 | 1·87<br>... | 6·62<br>8·23 | 67·60<br>144·21 | 4·75<br>.. | 1,480,150<br>... | 1·50&1·45<br>... | 1·274<br>... |
| Doncaster ... | ... | ... | ... | 8·49 | 8·29 | 1·94 | ·44 | 2·06 | 1·86 | 6·30 | 75·1 | 4·44 | 683,855 | 1·375 | 1·35 |
| Dundee ... ... | ... | 46 | 1,000 | 11·263 | 10·980 | 2·904 | ·891 | 1·306 | 1·976 | 7·077 | 61·9 | 5·10 | 2,356,993 | 1·125 | 1·764 |
| East Ham ... | ... | ... | ... | 10·39 | 10·26 | 2·90 | 1·08 | 1·79 | 1·69 | 7·46 | 71·8 | 5·77 | 1,995,635 | 1·125 | 1·49 |
| Exeter ... ... | ... | 2,043 | ... | 9·272 | 9·272 | 2·498 | ·650 | ·726 | 1·937 | 5·811 | 62·67 | 3·874 | 516,793 | 1·625 | 1·192 |
| Gloucester ... | ... | ... | ... | 6·694 | 6·258 | 2·498 | ·627 | ·929 | ·784 | 4·838 | 72 | 4·054 | 472,359 | 1 | ·77 |
| Halifax ... ... | ... | ... | 7,181 | 11·816 | 11·702 | 3·023 | ·926 | 1·702 | 2·116 | 7·767 | 65 | 5·65 | 3,900,902 | 1·125 | 1·81 |
| Ilford ... ... | ... | ... | ... | 9·356 | 9·186 | 2·826 | ·636 | 1·531 | 1·476 | 6·469 | 69·2 | 4·993 | 994,999 | 1·125 | 1·31 |
| Ilkeston ... ... | ... | ... | ... | 6·73 | 6·57 | 2·36 | ·58 | 1·63 | 1·49 | 6·06 | 90·25 | 4·57 | 339,920 | 1·042 | 1·4 |
| Ipswich ... ... | 268 | ... | ... | 8·408 | 8·110 | 2·900 | ·657 | 1·442 | 1·258 | 6·257 | 74·41 | 4·999 | 672,411 | 1·25 | 1·007 |
| Keighley ... ... | ... | ... | ... | 9·721 | 9·473 | 2·736 | ·715 | ·929 | 1·532 | 5·912 | 61 | 4·380 | 248,096 | 1·5 | 1·021 |
| Kilmarnock ... | ... | ... | ... | 6·709 | 6·525 | 2·541 | ·601 | ·769 | 1·362 | 5·273 | 78·6 | 3·911 | 336,801 | 1·25 | 1·09 |
| Kirkcaldy ... | 1,370 | ... | ... | 8·22 | 7·97 | 2·398 | ·587 | ·774 | 1·337 | 5·096 | 63·95 | 3·75 | 632,581 | 1 | 1·337 |
| Lancaster ... | ... | ... | ... | 7·92 | 7·61 | 3·130 | ·664 | 1·221 | 2·269 | 7·284 | 91 | 5·015 | 228,902 | 1·7 | 1·33 |
| Leith ... ... | 2,093 | ... | ... | 8·72 | 8·51 | 2·28 | ·61 | ·91 | ·78 | 4·58 | 52·54 | 3·8 | 863,202 | ·875 | ·9 |
| Leyton ... ... | 1,478 | ... | ... | 10·365 | 10·142 | (c) 3·143 | ·964 | 1·417 | 1·711 | 7·235 | 66·241 | 5·524 | 2,542,672 | 1·078 | 1·587 |
| Lincoln ... ... | 381 | ... | ... | 10·24 | 10·05 | 2·21 | ·94 | 1·47 | 1·38 | 6·00 | 58·7 | 4·62 | 183,807 | 1·25 | 1·107 |
| Liverpool ... | ... | ... | 66,929 | 12·03 | 12·28 | 3·184 | 1·120 | 1·529 | 2·171 | 8·004 | 63·6 | 5·833 | ... | ... | ... |
| Lowestoft ... | ... | ... | ... | 8·3 | 8·3 | 2·5 | ·6 | 1·6 | 2·18 | 6·9 | 83·40 | 4·8 | 385,731 | 1·75 | 1·2 |
| Maidstone ... | ... | ... | ... | 8·19 | 7·77 | 1·942 | ·900 | ·952 | 1·55 | 5·344 | 69 | 3·79 | 358,616 | 1·25 | 1·25 |
| Manchester ... | ... | ... | 100,000 | 11·351 | 11·202 | 3·269 | 1·069 | 1·085 | 1·709 | 7·132 | 62·83 | 5·423 | 30,492,127 | 1·046 | 1·625 |
| Nelson ... ... | 1,889 | ... | ... | 12·29 | 12·23 | 2·89 | ·81 | 1·58 | 2·39 | 7·67 | 62 | 5·28 | 240,804 | 2 | 1·2 |
| Newport (Mon.)... | ... | ... | ... | 9·557 | 9·310 | 2·542 | ·994 | 1·570 | 1·746 | 7·852 | 82·26 | 6·106 | 1,239,245 | 1·28 | 1·28 |
| Nottingham ... | ... | 5,775 | 19,000 | 11·50 | 11·34 | 3·00 | 1·05 | 1·29 | 2·11 | 7·45 | 64·19 | 5·39 | 5,761,096 | 1·25 | 1·65 |
| Oldham ... ... | ... | ... | ... | 12·616 | 12·515 | 3·100 | ·857 | 2·110 | 2·729 | 8·796 | 69·72 | 6·067 | 3,541,360 | 1·375 | 1·823 |
| Perth ... ... | ... | ... | ... | 8·88 | 8·46 | 3·59 | ·64 | ·43 | 1·27 | 5·93 | 59 | 4·04 | 289,473 | 1·083 | 1·17 |
| Plymouth ... | ... | ... | 3,027 | 11·253 | 11·007 | 2·346 | 1·041 | 1·488 | 2·247 | 7·122 | 63·52 | 4·875 | 1,087,297 | 1·672 | 1·34 |
| Pontypridd ... | ... | ... | ... | 10·92 | 10·78 | 2·71 | ·75 | 3·37 | 1·87 | 8·70 | 80·65 | 6·83 | 701,941 | 1·25 | 1·49 |
| Rawtenstall ... | ... | 1,550 | ... | 11·16 | 10·71 | 2·35 | ·98 | ·92 | 1·76 | 6·01 | 53·54 | 4·25 | 687,821 | 1·381 | 1·27 |
| Rochdale ... ... | 6,486 | ... | ... | 11·020 | 10·966 | 2·479 | ·691 | 1·067 | 1·533 | 5·770 | 51·2 | 4·237 | 2,250,037 | 1·016 | 1·508 |
| Rotherham ... | ... | ... | 750 | 11·950 | 11·906 | 2·996 | ·846 | 1·729 | 2·832 | 8·403 | 70·32 | 5·571 | 1,359,602 | 1·5 | 1·88 |
| Salford ... ... | ... | ... | 18,000 | 10·497 | 10·494 | 2·807 | ·677 | 1·022 | 1·949 | 6·455 | 62 | 4·506 | 9,137,678 | 1·238 | 1·58 |
| Southampton ... | 8,971 | ... | 5,000 | 10·672 | 10·307 | 2·857 | ·788 | 1·418 | 2·010 | 7·073 | 66·3 | 5·063 | 1,874,217 | 1·625 | 1·266 |
| Southend-on-Sea | 2,514 | 1,000 | 6,000 | 13·14 | 12·97 | 3·03 | ·85 | 1·33 | 2·33 | 7·54 | 57·35 | 5·21 | 848,538 | 1·75 | 1·33 |
| Southport ... | ... | ... | ... | 9·827 | 9·611 | 2·495 | 1·034 | 1·446 | 1·791 | 6·766 | 70·3 | 4·9 | 545,793 | 1·50 | 1·172 |
| South Shields ... | (d) 500 | 4,218 | 1,600 | 10·066 | 9·919 | 2·253 | ·885 | ·729 | 1·566 | 5·433 | 56·28 | 4·077 | 914,188 | 1·407 | 1·122 |
| Stalybridge, &c. | ... | ... | ... | 7·880 | 7·729 | 2·686 | ·887 | 1·387 | 1·425 | 6·385 | 81·33 | 4·960 | 1,719,696 | ·9 | 1·584 |
| Stockport ... | .. | 540 | 9,000 | 10·434 | 10·221 | 2·133 | ·638 | 1·103 | ·820 | 4·694 | 44·99 | 3·874 | 1,704,943 | 1·036 | 1·218 |
| Sunderland ... | ... | ... | 5,000 | 11·208 | 11·149 | 2·999 | ·741 | ·760 | 1·834 | 6·334 | 56·81 | 4·50 | 1,764,971 | 1·5 | 1·19 |
| Wallasey ... | 234 | (f) 200 | 6,000 | 11·357 | 11·207 | 3·142 | (g) ·787 | 1·032 | 2·563 | 7·497 | 66 | 4·96 | 1,916,450 | 1·625 | 1·56 |
| Walsall ... ... | 3,392 | ... | 500 | 11·326 | 11·038 | 2·578 | 1·094 | 1·487 | 1·410 | 6·569 | 58 | 5·159 | 780,825 | 1·25 | 1·172 |
| Walthamstow ... | 1,800 | ... | ... | 9·31 | 9·13 | 3·20 | ·61 | 1·24 | 1·77 | 6·82 | 73·32 | 5·05 | 1,188,326 | 1·5 | 1·18 |
| Warrington ... | 1,481 | ... | 1,500 | 12·398 | 12·237 | 2·954 | ·950 | 2·273 | 1·728 | 7·906 | 64·611 | 6·177 | 517,587 | 1·50 | 1·152 |
| West Ham ... | ... | ... | ... | 9·43 | 9·329 | 3·554 | ·761 | 1·823 | 1·313 | 7·451 | 78 | 6·038 | 6,103,884 | ·75 | 1·72 |
| Wigan ... ... | ... | ... | ... | 12·05 | 11·80 | ... | ... | ... | ... | 6·84 | 56·77 | 5·09 | 2,132,384 | ... | 1·471 |
| Wolverhampton ... | ... | ... | 3,777 | 11·250 | 11·086 | 2·518 | ·854 | 1·507 | 1·393 | 6·272 | 55·75 | 4·879 | 1,620,970 | 1 | 1·388 |
| Yarmouth (Gt.)... | 1,062 | ... | ... | 8·605 | 8·425 | 2·655 | ·666 | ·938 | 1·564 | 5·823 | 67·95 | 4·259 | 655,315 | 1·60 | ·974 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | * | | | | | Works Cost. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | ... | ... | 24,763 | 10·27 | 10·12 | 2·98 | ·55 | 1·31 | ·96 | 5·80 | 56·33 | 4·83 | 9,733,420 | ·589 | 1·40 |
| Bexley ... ... | 40 | .. | ... | 12·8 | 12·63 | 3·04 | ·89 | 1·75 | ·87 | 6·55 | 60·3 | 5·68 | 350,103 | ·63 | 1·37 |
| Birkenhead ... | ... | ... | ... | 12·075 | 11·89 | 3·128 | ·779 | 2·016 | 1·141 | 7·064 | 58·49 | 5·923 | 2,490,713 | ·565 | 2·016 |
| Bournemouth ... | ... | 3,379 | ... | 11·92 | 11·89 | 2·91 | ·99 | 1·44 | (b) 1·79 | 7·13 | 59·83 | 5·34 | 2,743,998 | ·576 | 1·48 |
| Cardiff ... ... | 6,926 | ... | 4,650 | 13·45 | 11·65 | 3·446 | ·976 | 1·382 | ·634 | 6·438 | 55 | 5·804 | 3,864,260 | ·415 | 1·49 |
| Glasgow ... ... | ... | ... | 33,003 | 10·404 | 10·364 | 3·141 | 1·263 | 1·471 | ·495 | 6·370 | 57·88 | 5·875 | 32,280,346 | ·358 | 1·38 |
| Huddersfield ... | ... | 13,370 | 6,590 | 11·04 | 10·73 | 2·70 | ·61 | 2·28 | 1·00 | 6·59 | 59·73 | 5·59 | 5,413,488 | ·42 | 2·27 |
| Hull ... ... | ... | 1,435 | 12,000 | 9·42 | 9·33 | 2·82 | ·68 | 2·46 | ·67 | 6·63 | 71·04 | 5·96 | 4,855,082 | ·67 | 1·31 |
| Leeds ... ... | ... | ... | 61,375 | 11·229 | 11·120 | 2·985 | ·984 | 1·089 | ·776 | 5·834 | 51·95 | 5·058 | 16,461,894 | ·440 | 1·807 |
| Leicester ... ... | ... | ... | 10,000 | 9·675 | 8·843 | 3·137 | ·622 | 1·443 | 1·024 | 6·226 | 64 | 5·202 | 6,558,800 | ·3645 | 1·79 |
| London ... .. | ... | H.84,551 | ... | H. 8·81<br>E. 11·29 | 8·62<br>10·98 | 4·12<br>3·42 | ·62<br>·93 | 1·11<br>1·45 | 4·67<br>·83 | 10·52<br>6·63 | 119·40<br>58·76 | 10·52<br>5·80 | 122,307,298 | ... ·61 | ... 2·51 |
| N'castle-on-Tyne | ... | ... | 13,442 | 11·841 | 11·317 | 3·170 | ·926 | 1·565 | (a) ·714 | 6·375 | 52·23 | 5·661 | 8,745,068 | ·356 | 1·904 |
| Northampton ... | 500 | 1,200 | 1,000 | 10·55 | 10·21 | 2·72 | 1·15 | ·93 | 1·34 | 6·14 | 58 | 4·80 | 934,909 | ·91 | 1·46 |
| Portsmouth ... | 8,068 | (f) 2,000 | 4,000 | 12·261 | 12·069 | 3·092 | 1·065 | 1·004 | ·488 | 5·649 | 46·08 | 5·161 | 2,583,580 | ·448 | 1·041 |
| Preston ... ... | ... | 6,241 | ... | 10·415 | 10·34 | 2·724 | 1·319 | 1·499 | ·602 | 6·144 | 59·22 | 5·542 | 1,377,176 | ·409 | 1·236 |
| Reading ... ... | ... | 1,344 | 1,860 | 8·968 | 8·676 | 2·229 | ·928 | 1·127 | ·849 | 5·133 | 57 | 4·28 | 955,400 | ·815 | ·90 |
| Sheffield ... ... | ... | 7,032 | 37,716 | 10·760 | 10·665 | 3·367 | ·664 | 1·298 | ·847 | 6·176 | 57·389 | 5·329 | 16,500,208 | ·673 | 1·837 |
| Wellington, N.Z. | 8,299 | ... | ... | 15·654 | 15·568 | 5·864 | ·755 | 2·222 | 1·694 | 10·535 | 67·3 | 8·841 | 4,921,406 | ·80 | 2·13 |

H—Horse lines. E—Electric trolley system. * The figures given under "Power" in Table II. include actual works costs only. (a) Including power and street lighting.
(b) Including ·09d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·05od. (d) Accident, insurance, and compensation fund.
(e) Total B.O.T. units, including lighting, 10,215,925. (f) Insurance fund. (g) Including ·09d. to Superannuation Fund. (i) Including Insurance.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Population Served. | Car Mileage. | Passengers Carried. | Passengers Carried per Car Mile. | Average Fare per Passenger. | Average Journeys per Head of Populat'n per Annum. | Average Car Miles per Day per Car. | Traffic Revenue per Mile of Single Track. | Average Traffic Revenue per Annum per Head of Populat'n Served. | Operating Expenses per Passenger. | Average Distance of 1d. Fare. | Average Fare Charged per Mile. | Average Speed per Hour. | Average Total Car Hours per Day. | Average Number of Cars in Use Daily. | Number of Cars in Stock. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | d | | | £ | | d. | Miles. | d. | Miles. | | | |
| Aberdeen ... | 165,000 | 1,758,966 | 19,990,711 | 11·49 | ·95 | 121·15 | 105·8 | 2,930 | 9/6 | ·519 | 1·69 | ·6 | 7·5 | 655 | 45 | 77 |
| Accrington ... | 70,000 | 531,356 | 4,577,019 | 8·6 | 1·43 | 65·3 | 105 | 2,572 | 7/10 | ·81 | 1·07 | ·929 | 7·5 | 242 | 17 | 27 |
| Ashton-u-L. | 50,000 | 457,856 | 4,754,139 | 10·383 | 1·077 | 95·083 | 104 | 2,606 | 8/6 | ·606 | 1·223 | ·81 | 8 | 204 | 12 | 21 |
| Ayr ... ... | 33,000 | 385,796 | 3,739,237 | 9·69 | ·96 | 113 | 106 | 1,981 | 9/2 | ·556 | 1·25 | ·75 | 8 | 14 | 10 | 20 |
| Birmingham | est.850,000 | 13,134,642 | 134,467,166 | 10·23 | 1·025 | 158 | 81·06 | 5,298 | 13/6 | ·66 | 2·34 | ·366 | 7·5 | 10·44 | 485 | 511 |
| Blackburn ... | 200,000 | 1,141,161 | 11,721,367 | 10·88 | 1·27 | 58·61 | 105 | 2,564 | 6/4 | ·87 | 1·25 | ·76 | 7·50 | 434 | 31 | 61 |
| Blackpool ... | 67,000 | 942,829 | 10,339,719 | 11 | 1·36 | 154·4 | 83 | 3,705 | 19/2 | ·934 | ... | ... | 8 | ... | 31 | 72 |
| Bolton ... | 221,000 | 2,831,003 | 30,287,673 | 10·69 | 1·065 | 137·04 | 121·66 | 2,875 | 12/3 | ·588 | 1·468 | ·627 | 7·25 | 1,030 | 60 | 106 |
| Bradford ... | 337,000 | 5,686,653 | 56,352,281 | 9·91 | 1·168 | 167 | 113·72 | 2,717 | 16/3 | ·767 | 1·60 | ·514 | 7·3 | 2,123·5 | 137 | 239 |
| Brighton ... | 132,965 | 1,118,309 | 11,312,855 | 10 | 1·09 | 85·55 | 82·83 | 3,012 | 7/11 | ·84 | 1·27 | ·788 | 6·41 | 544 | 34 | 50 |
| Burnley ... | 175,000 | 1,449,647 | 15,949,359 | 11 | 1·18 | 91 | 95 | 3,620 | 9/1 | ·744 | 1·25 | ·83 | 7 | 760 | 40 | 57 |
| Burton ... | 48,000 | 437,106 | 3,188,655 | 7·30 | 1·082 | 66 | ... | 1,684 | 5/10 | ·928 | 1·505 | ·58 | 7·5 | ... | ... | 20 |
| Bury ... ... | 128,202 | 1,599,872 | 15,132,553 | 9 | 1·07 | 118·03 | 102·33 | 1,957 | 10/6 | ·535 | 1·24 | ·85 | 8·56 | 506·64 | 42·71 | 54 |
| Chester ... | 39,038 | 347,904 | 3,078,564 | 8·85 | ·96 | 2·34 | 95 | 1,944 | 6/4 | ·622 | 1·27 | ·8 | 7 | 150·6 | 10·04 | 18 |
| Chesterfield | 38,000 | 289,890 | 2,519,533 | 8·69 | 1·1 | 66 | 132 | 2,249 | 6/5 | ·702 | 1·38 | ·75 | 7·33 | 117 | 6·5 | 14 |
| Colchester ... | 44,160 | 323,524 | 1,871,896 | 5·79 | 1·32 | 42·39 | 89·3 | 1,295 | 4/8 | 1·06 | ·85 | 1·09 | 6·81 | 157·92 | 9·87 | 18 |
| Croydon ... | 170,451 | 2,687,824 | 20,504,143 | 7·74 | 1·06 | 120·29 | 125 | 4,734 | 10/7 | ·775 | 2·15 | ·50 | 7·92 | 915·82 | 58 | 75 |
| Darlington ... | 58,000 | 381,920 | 3,791,835 | 9·9 | ·75 | 65·38 | 95·1 | 1,345 | 4/1 | ·557 | 1·219 | ·45 | 6·66 | 151·25 | 11 | 16 |
| Darwen ... | 40,611 | 249,950 | 2,785,037 | 11·1 | 1·17 | 68·5 | 40 | 2,029 | 7/2 | ·781 | 1·05 | ·78 | 8 | 115·56 | 6·42 | 17 |
| Derby ... | 124,544 | E 1,161,398<br>H. 17,876 | 10,604,977<br>98,364 | 9·13<br>5·44 | 1·05<br>·993 | 85·15 | ... | 2,103<br>... | 7/5<br>... | ·724<br>1·49 | 1·44<br>1 | ·75<br>1 | 6·375<br>... | ... | ... | 50<br>... |
| Doncaster ... | 50,000 | 504,250 | 4,532,626 | 8·98 | ·922 | 90·65 | 115 | 1,479 | 7/- | ·702 | 1·25 | ·76 | 7·5 | 221 | 14 | 25 |
| Dundee ... | 165,000 | 1,335,512 | 17,022,560 | 12·74 | ·861 | 103 | 87 | 2,222 | 7/7 | ·555 | 2 | ·50 | 7·3 | 555 | 42 | 66 |
| East Ham ... | 133,000 | 1,340,252 | 17,789,734 | 13·27 | ·77 | 134 | ... | 3,981 | 8/7 | ·56 | 1·63 | ·65 | ... | ... | ... | 45 |
| Exeter ... | 48,660 | 433,807 | 4,110,513 | 9·48 | ·98 | 84·48 | ... | 2,392 | 6/11 | ·612 | 1 | 1 | 6 | ... | 16 | 20 |
| Gloucester ... | 52,795 | 609,531 | 4,111,175 | 6·7 | ·92 | 77 | 92·5 | 1,059 | 6/- | ·70 | 1·5 | ·66 | 7·11 | 243 | 18 | 30 |
| Halifax ... | 176,000 | 2,152,391 | 19,456,923 | 9·04 | 1·27 | 110 | 79·5 | 1,912 | 11/11 | ·86 | 1·35 | ·84 | 6·8 | 814 | 74 | 95 |
| Ilford ... | 80,000 | 758,456 | 7,784,992 | 11·21 | ·84 | 97·31 | 130 | 2,560 | 6/10 | ·630 | 1·543 | ·69 | 8 | ... | 16 | 26 |
| Ilkeston ... | 32,000 | 238,645 | 1,732,846 | 7·25 | ·9 | 54 | 117 | 1,713 | 6/1 | ·836 | 3·2 | ·35 | 7·5 | 108 | 7·5 | 13 |
| Ipswich ... | 75,300 | 668,025 | 5,554,585 | 8·31 | ·975 | 73·76 | 65·5 | 1,518 | 6/- | ·75 | 1·53 | ·693 | 6·17 | 234·19 | 20·78 | 36 |
| Keighley ... | 42,000 | 242,919 | 2,245,120 | 9·242 | ·98 | 53·45 | 55·42 | 1,568 | 4/7 | ·639 | 2·22 | ·45 | 6·87 | 126 | 7 | 12 |
| Kilmarnock | 36,000 | 308,976 | 2,268,033 | 7·34 | ·88 | 63 | 90·34 | 1,508 | 4/8 | ·728 | 1·13 | ·86 | 7·22 | 116·5 | 9·37 | 14 |
| Kirkcaldy ... | 39,600 | 473,089 | 5,237,947 | 11·07 | ·719 | 132·27 | 59 | 1,786 | 7/11 | ·46 | 1·522 | ·64 | 7·5 | 195 | 15 | 22 |
| Lancaster ... | 41,414 | 171,475 | 1,461,104 | 8·52 | ·893 | 35 | 75 | 1,132 | 2/8 | ·854 | 1·71 | ·5 | 8 | 88·2 | 6·3 | 12 |
| Leith ... | 81,000 | 954,563 | 9,339,324 | 9·7 | ·87 | 115·30 | 123 | 1,880 | 8/4 | ·46 | 1·32 | ·72 | 8·2 | 320 | 21·33 | 37 |
| Leyton ... | 124,736 | 1,601,833 | 16,897,512 | 10·549 | ·873 | 135 | 104 | 3,324 | 9/10 | ·590 | ... | ... | 7·70 | 574·56 | 42 | 60 |
| Lincoln ... | 20,000 | 160,446 | 1,733,259 | 10·8 | ·92 | 86·66 | 64·08 | 2,264 | 6/8 | ·556 | 1·75 | ·428 | 7 | 90 | 5 | 8 |
| Liverpool ... | ... | 12,590,408 | 134,249,967 | 10·66 | 1·128 | ... | ... | 5,303 | ... | ·756 | 2·45 | ... | ... | ... | 445 | 587 |
| Lowestoft ... | 35,000 | 308,897 | 2,462,188 | 8 | 1·05 | 70·35 | ... | 2,646 | 6/2 | ·878 | univ'rs'l p | enny fare | ... | ... | ... | 19 |
| Maidstone ... | 25,000 | 287,179 | 2,096,488 | 7·3 | 1·062 | 83·85 | 70 | 1,319 | 7/5 | ·73 | 1 | 1 | 6·7 | 128 | 12 | 19 |
| Manchester | 950,000 | 18,768,259 | 187,675,183 | 10 | 1·12 | 198 | 95·8 | 4,990 | 17/5 | ·713 | 2·368 | ·422 | 7·25 | ... | 537 | 629 |
| Nelson ... | 45,000 | 200,996 | 2,776,785 | 13·82 | ·88 | 61·71 | 94·09 | 2,650 | 4/4 | ·555 | 1 | 1 | 5·50 | 108 | 6 | 11 |
| Newport ... | 87,626 | 968,067 | 9,251,181 | 9·56 | ·973 | 105·6 | ... | 2,617 | 8/7 | ·821 | 1·75 | ... | ... | ... | 37 | 44 |
| Nottingham | 260,000 | 3,485,789 | 38,484,032 | 11·04 | 1·02 | 148 | 92·08 | 4,514 | 12/8 | ·67 | 1·68 | ·65 | 6·86 | ... | 104 | 135 |
| Oldham ... | 180,000 | 1,942,147 | 20,073,483 | 10·335 | 1·19 | 111·51 | 106·5 | 2,796 | 11/3 | ·851 | 1·12 | ·884 | 6·56 | 800 | 50 | 92 |
| Perth... ... | 35,900 | 253,851 | 1,861,145 | 7·33 | 1·15 | 51·84 | 96·25 | 1,892 | 5/5 | ·72 | ... | ... | 6·25 | 120 | 8 | 12 |
| Plymouth ... | 112,000 | 809,036 | 8,666,269 | 10·71 | 1·026 | 77·377 | 93·5 | ... | 6/8 | ·667 | ... | ... | ... | 25·5 | ... | 42 |
| Pontypridd... | 40,000 | 470,215 | 4,721,110 | 10·04 | 1·07 | 118 | 83·4 | 2,457 | 10/7 | ·77 | 1·25 | ·51 | 6·5 | 234 | 18 | 26 |
| Rawtenstall | 30,516 | 539,320 | 4,669,522 | 8·66 | 1·24 | 93·39 | 123 | 1,515 | 15/9 | ·69 | 1·12 | ·88 | 9 | 16½ | 12 | 22 |
| Rochdale ... | 130,000 | 1,589,866 | 12,711,114 | 7·99 | 1·35 | 97·7 | 114·90 | 1,825 | 11/2 | ·76 | 1·07 | ·90 | 7·66 | 645 | 43 | 69 |
| Rotherham... | 64,000 | 720,133 | 7,813,922 | 10·85 | 1·097 | 122·1 | 116 | 2,977 | 11/2 | ·774 | 1·5 | 1 | 12 | 19 | 20 | 36 |
| Salford ... | 350,000 | 5,808,389 | 48,720,788 | 8·38 | 1·30 | 139 | 114 | 3,386 | 14/6 | ·76 | 1·85 | ·55 | 7·96 | 2,135 | 140 | 200 |
| Southampt'n | 122,200 | 1,486,746 | 12,348,658 | 8·306 | 1·241 | 101 | ... | 3,592 | 10/5 | ·85 | ... | ... | ... | ... | ... | 68 |
| Southend ... | 78,000 | 637,366 | 7,581,104 | 11·89 | 1·09 | 97·2 | 87 | 4,708 | 8/10 | ·634 | 1·41 | ·76 | 6·5 | 17 | 21 | 31 |
| Southport ... | 31,312 | 465,100 | 4,745,450 | 10·203 | ·945 | 151·55 | 103·7 | 1,754 | 11/11 | ·663 | 1·6 | ·630 | 6·65 | 210 | 14 | 26 |
| So'th Shields | 110,513 | 814,212 | 8,456,688 | 10·386 | ·942 | 76·5 | 129·2 | 3,332 | 6/1 | ·545 | 1·825 | ·54 | 7·61 | 282 | 16 | 35 |
| Stalybridge | 92,933 | 1,088,545 | 8,896,836 | 8·123 | ·943 | 95·7 | ... | 1,280 | 7/6 | ·779 | 1·275 | ·784 | 6·8 | ... | ... | 60 |
| Stockport ... | 120,000 | 1,399,314 | 10,665,098 | 7·6 | 1·341 | 88·8 | 76·6 | 2,158 | 9/11·3 | ·615 | 1·25 | ·72 | 7·5 | 465 | 38 | 50 |
| Sunderland ... | 170,000 | 1,474,637 | 16,972,537 | 11·5 | ·968 | 99·8 | 79·3 | 3,366 | 8/1 | ·550 | 1·34 | ·68 | 7 | 672 | 42 | 70 |
| Wallasey ... | 81,000 | 1,227,935 | 11,459,807 | 9·33 | 1·20 | 141·48 | 98·6 | 2,887 | 14/2 | ·803 | 1·99 | ·52 | 7 | 590 | 42 | 55 |
| Walsall ... | 100,000 | 665,964 | 5,683,798 | 8·535 | 1·293 | 87 | 57 | 1,750 | 6/1 | ·769 | 1·24 | ·77 | 7 | 315 | 21 | 39 |
| Walth'mst'w | 126,000 | 1,004,872 | 12,049,323 | 11·99 | ·762 | 95·63 | 97 | 3,052 | 6/1 | ·569 | 1·15 | ·89 | 7·2 | 408 | 36 | 38 |
| Warrington | 86,000 | 449,206 | 6,064,139 | 13·5 | ·906 | 70·513 | 102·533 | 2,372 | 5/4 | ·584 | 1·246 | ·803 | 6·408 | 192·048 | 12·003 | 21 |
| West Ham ... | 294,200 | 3,544,292 | 40,200,347 | 11·34 | ·822 | 136 | 98 | 4,592 | 9/4 | ·65 | 1·80 | ·56 | 7·66 | 1,262·25 | 99 | 118 |
| Wigan ... | 200,000 | 1,449,188 | 13,018,833 | 8·98 | 1·314 | 65·1 | 105·5 | 2,309 | 7/2 | ·761 | 1·15 | ... | 7·4 | ... | 42 | 67 |
| Wolverh'ton | 135,000 | 1,168,239 | 11,913,122 | 10·198 | 1·08 | 89·25 | 87 | 2,510 | 8/- | ·615 | 1·18 | ·879 | 6·85 | 622·2 | 36·6 | 49 |
| Yarmouth ... | 55,800 | 673,027 | 4,514,871 | 6·7 | 1·256 | 80·91 | 73·7 | 1,687 | 8/6 | ·868 | 1·25 | ·76 | 7 | 375 | 25 | 35 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... | 385,492 | 5,946,659 | 58,437,942 | 9·82 | 1·07 | 151 | 128 | 2,539 | 13/- | ·592 | 1·96 | ·43 | 8·75 | 2,256 | 141 | 282 |
| Bexley ... | 16,000 | 262,658 | 2,130,189 | 8·11 | 1·56 | 133 | ... | 2,360 | 18/11 | ·95 | 1·37 | ·62 | 7·5 | ... | 8 | 16 |
| Birkenhead | 130,832 | 1,235,277 | 13,622,361 | 11·02 | 1·077 | 104·12 | 68·64 | 2,540 | 9/4 | ·702 | 1·39 | ·66 | 6·61 | 511·73 | 49·30 | 59 |
| Bournem'uth | 120,000 | 1,844,507 | 15,121,935 | 8·09 | 1·45 | 126 | 84·23 | 3,069 | 15/3 | ·87 | 1·19 | ·87 | 6·80 | 820 | 60 | 81 |
| Cardiff ... | 182,729 | 2,586,421 | 27,561,652 | 10·66 | 1·09 | 151 | 98·5 | 3,947 | 13/9 | ·69 | 1·44 | ·736 | 7·5 | 1,104 | 69 | 130 |
| Glasgow ... | 1,150,000 | 23,335,008 | 311,480,086 | 13·348 | ·776 | 270·85 | 105·49 | 5,139 | 17/6 | ·477 | 2·31 | ·44 | 8·13 | 8,484·59 | 606·04 | 843 |
| Huddersfield | 160,000 | (a) 2,383,858 | 21,595,569 | 9·09 | 1·18 | 144 | 120 | 3,675 | 13/4 | ·728 | 1·39 | ·70 | 7·48 | 868·32 | 54·27 | 86 |
| Hull ... ... | 287,032 | 4,040,739 | 42,997,226 | 10·64 | ·877 | 149·80 | 127·10 | 5,141 | 10/7 | ·631 | 2·75 | ... | 9 | 1,393·6 | 87·10 | 160 |
| Leeds ... | 500,000 | 8,795,465 | 89,668,185 | 10·2 | 1·088 | 179 | 113·35 | 3,594 | 16/3 | (b) ·937 | 1·95 | ·539 | 7·48 | 3,190 | 213 | 232 |
| Leicester ... | 229,296 | 3,663,215 | 32,907,795 | 8·983 | ·981 | 143 | 95 | 3,648 | 11/9 | ·693 | 2·18 | ·984 | 8 | 18 | 107 | 140 |
| London ... | ... | H 1,680,786<br>E 48,777,026 | 17,347,746<br>516,092,489 | 10·32<br>10·58 | ·84<br>1·04 | ...<br>... | 83<br>113 | 2,646<br>8,732 | ...<br>... | 1·019<br>·627 | ...<br>... | ...<br>... | 6·15<br>8·44 | 742·5<br>15,786·8 | 55<br>1,179 | 96<br>1,584 |
| Newcastle ... | 300,000 | 4,593,419 | 49,348,688 | 10·74 | 1·087 | 164 | ... | 3,595 | 14/5 | ·59 | 1·58 | ·633 | 7 | ... | ... | 186 |
| Northampt'n | 90,793 | 640,158 | 6,727,190 | 10·51 | ·97 | 76·53 | ... | 2,974 | 6/- | ·58 | 1·34 | ·7 | 6·91 | ... | ... | 26 |
| Portsmouth | 236,732 | 2,204,042 | 25,039,320 | 11·36 | 1·066 | 110 | 84 | 3,593 | 9/5 | ·497 | 1·66 | ·62 | 7 | 1,086 | 72 | 100 |
| Preston ... | 120,000 | 936,553 | 9,000,070 | 9·61 | 1·02 | 75 | 130 | 3,802 | 6/9 | ·639 | 1·01 | ·95 | 7·36 | 380 | 20 | 30 |
| Reading ... | 75,500 | 917,045 | 8,279,650 | 9·02 | ·97 | 109 | 97 | 2,505 | 8/9 | ·57 | 1·59 | ·68 | 7 | 352 | 26 | 36 |
| Sheffield ... | 466,408 | 8,071,188 | 96,330,242 | 11·935 | ·893 | 206·535 | 103·32 | 4,606 | 15/5 | ·517 | 2·62 | ·386 | 7·372 | 3,103·27 | 214·019 | 279 |
| Wellington... | 68,000 | 2,303,913 | 23,858,412 | 11·08 | 1·40 | 350 | 90 | 4,706 | 43/11 | ·94 | 1·112 | ·88 | 7·86 | 803 | 70 | 89 |

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.
(c) Includes tramway operating cost only, excludes cost bulk supply to lighting department.

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# TRAMWAY AND OMNIBUS SHARE LIST.

## Specially Compiled for "The Tramway and Railway World."

| Amount Ranking for Dividend. | Shares. | Name. | Div'd. Prev. Half-year. | Div'd. Last Half-year. | Quotations, August 29. | Movement Since July 3. Rise. | Fall. | Latest Business Done. Price. | Date. | Yield on Buying Price. £ s. d. | Dividend Due. (Final in Italics.) | Quotations, Jan., 1908, to August 29, 1913. Highest | Lowest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 640,000 | 5 | Anglo-Argentine Tramways 5½% Cum. 1st Pref. | 2/9 | 2/9 | 4¼–4⅛ | ... | — ⅛ | 96/3 | Aug. 28 | 5 11 6 | Jan., Dec. | 5⅛ | 4⅛ |
| 500,000 | 5 | Do. do. 5½% Cum. 2nd Pref. | 2 9 | 2 9 | 4⅜–4⅛ | ... | — ⅛ | 90/– | Aug. 16 | 5 19 0 | June, *Dec.* | 5⅛ | 4⅛ |
| 1,500,000£ | ... | Do. do. 5% Deb. Stock Red. | 5% | 5% | 97½–99½ | + 1 | ... | 98⅜ | Aug. 29 | 5 2 6 | June, Dec. | 105½ | 95⅜ |
| 325,532£ | Stk. | Auckland Elec. Trys. Co. 5% Mort. Deb. .. | 5% | 5% | 100–102 | + 1 | ... | 101½ | Aug. 27 | 4 18 0 | Jan., July. | 107 | 101 |
| 75,000 | 1 | Bath Electric Tramways 5% Cum. Pref. ... | 6d. | 6d. | ⅛–¼xd | ... | ... | 14/6 | Dec. 31 | 6 3 3 | *Jan.* & July | ⅛ | ⅛ |
| 334,696£ | Stk. | Birmingham Dist. Pow. & Tract. 4½% 1st Deb.... | 4½% | 4½% | 86–88 | ... | .. | 86¾ | Aug. 28 | 5 2 3 | Jan., July. | 96 | 77 |
| 15,000 | 10 | Blackpool and Fleetwood Tramways ... .. | 9/- | 4/- | 13½ -13¾ | ... | — ⅜ | 14 | Mar. 10 | 4 14 6 | Feb., Aug. | 14½ | 12 |
| 60,000 | 10 | Bombay Elec. Supply & Trys. Co. 6% Cum. Pref. | 6/- | 6/- | 10¾–11½ | ... | ... | 11⅜ | Aug. 25 | 5 4 6 | Feb., Aug. | 12½ | 7⅜ |
| 1,003,614 | $100 | Brazil Traction... ... ... ... ... ... | 6 | 6 | 95½–96¾ | + 8¾ | ... | 96 | Aug. 29 | 6 7 6 | Feb.My.Ag.Nv. | 105½ | 86 |
| 75,000 | 5 | Brisbane Elec. Tramways Investment Co. Ord. | 4/- | 4/- | 7–7½ | + ⅛ | ... | 7 5/32 | Aug. 26 | 5 13 6 | *May*, Oct. | 9½ | 3⅛ |
| 75,000 | 5 | Do. do. do. 5% Cum. Pref. | 2/6 | 2/6 | 4¾–5⅛ | ... | ... | 5 | Aug. 5 | 4 17 9 | *May*, Nov. | 5⅜ | 4⅜ |
| 50,000 | 10 | Bristol Tramways and Carriage Co. ... ... | 4 | 4 | 5⅛–5¾ | ... | — ⅜ | 5⅜ | Nov. 9/10 | 6 19 3 | *Feb.*, Aug. | 14½ | 5 |
| 50,000 | 10 | Do. do. do. 4% Cum. Pref. | 4 | 4 | 6¾–7¼ | ... | — ⅛ | 7 | Sept. 30/12 | 5 10 6 | Jan., July. | 9¾ | 6¾ |
| 800,000£ | Stk. | British Columbia Electric Railway Def. Ord. .. | 8% | 8% | 125 –130 | + 4 | ... | 128½ | Aug. 29 | 6 3 3 | May, Nov. | 156 | 121 |
| 800,000£ | Stk. | Do. do. Pref. Ord. ... .. | 6% | 6% | 111–116 | + 4 | ... | 124¾ | Aug. 29 | 5 3 6 | Feb., Aug. | 132½ | 105 |
| 800,000£ | Stk | Do. do. 5% Cum. Perp. Pref. | 5% | 5% | 102–105 | + 1 | ... | 104½ | Aug. 29 | 4 15 6 | Jan., July. | 114 | 99 |
| 1,070,097£ | Stk. | British Electric Traction Pref'd. Ord. ... ... | ... | ... | 10¼–12 | + 1¾ | ... | 10⅞ | Aug. 25 | ... | Apr., *Oct.* | 16 | 8½ |
| 403,503£ | Stk. | Do. do. 6% Cum. Pref. .. | 6% | 6% | 86 –89 | + 8 | ... | 87½ | Aug. 28 | 6 15 0 | Feb., *Aug.* | 95¼ | 78 |
| 1,464,245£ | Stk. | Do. do. 5% Perp. Deb. ... | 5% | 5% | 91–94 | + 1 | ... | 93 | Aug. 29 | 5 9 0 | April, Oct. | 101 | 82½ |
| 439,796£ | Stk. | Do. do. 4½% 2nd Deb. Red. ... | 4½% | 4½% | 75–78 | + 1 | ... | 75 | Aug. 27 | 5 17 9 | May, Nov. | 84 | 58 |
| 246,625£ | Stk. | Buenos Aires Port & City Trys. 6% 1st Mt. Deb. | 6% | 6% | 87–91 | ... | — 5 | 90¾ | Aug. 20 | 6 12 0 | Feb., Aug. | 103 | 61 |
| 623,270£ | Stk. | Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt Deb. | 5% | 5% | 36½–98½ | ... | ... | 98 | Aug. 27 | 5 1 6 | Mar., Sept. | 103 | 89 |
| 137,610 | 5 | Calcutta Tramways Ord. ... ... ... | 2/6 | 5/- | 5¼–6¼ | + ⅛ | ... | 6 | Aug. 18 | 6 0 0 | *Apr.*, Oct. | 7⅛ | 4 |
| 47,295 | 5 | Do. 5% Cum. Pref. ... ... | 2/6 | 2/6 | 4⅛–5⅛ | + 1/16 | ... | 5 | July 10 | 4 17 9 | Jan., July | 5⅜ | 4⅛ |
| 491,222 | 1 | Cape Electric Tramways ... ... ... ... | 1/- | for '12 | ⅛–⅛ | ... | ... | 15/- | Aug. 29 | 6 3 3 | Feb., *Nov.* | ⅛ | ⅛ |
| 15,000 | 10 | Carthagena and Herrerias Steam Tramways ... | 4/- | May, '13 | 3—3½ | ... | — ½ | 75/– | May 6 | 5 6 9 | April. | 7 | 3 |
| 248,000 | 5 | City of Buenos Ayres Tramways (1904) ... | 2/6 | 2/6 | 5 1/16–5 1/16 | + 1/16 | ... | 5 1/32 | Aug. 29 | 4 10 0 | Fe.My.Au.No | 6 | 5⅛ |
| 120,000£ | Stk. | Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ... | 5% | 5% | 90½–94½ | ... | ... | 96 | Jan. 31 | 5 6 0 | May, Nov. | 101 | 87 |
| 11,500 | 10 | Cork Electric Tramways and Lighting Co. .... | ... | 6/- ann. | 4¼–4¾ | ... | ... | 4 3/32 | Dec. 23 | 6 6 6 | *Mar.* | 10 | 4½ |
| 12,327 | 10 | Do. do. do. 5% Cum Pref. | 5/- | 5/- | 7½–7¾ | ... | ... | 8 1/16 | June 12 | 6 9 0 | Jan., July | 10½ | 7⅛ |
| 3,000 | 10 | Dublin and Lucan Elec. Railway 5% Cum. Pref | 5/- | 5/- | 8½–9 | ... | ... | 9 | Aug. 25/10 | 5 11 3 | Sep.15,Mar.15 | 9½ | 6 |
| 60,000 | 10 | Dublin United Tramways Co. (1896), Ltd., Ord. | 6/- | 6/- | 10¾–11 | ... | — ⅛ | 10⅞ | Aug. 28 | 5 9 3 | Feb., Aug. | 14 | 11 |
| 60,000 | 10 | Do. do. do. 6% Cum. Pref. | 6/- | 6/- | 11¼–12⅜ | ... | ... | 12⅛ | June 23 | 4 14 3 | *Feb.*, Aug. | 14 | 11⅛ |
| 13,500 | 10 | Gateshead & District Trys. Co. Ord. ... ... | 5/– | 9/- | 8½–9 | ... | ... | 8 1/16 | Apr. 7 | 7 15 0 | *Mar.*, Sept. | 9½ | 7⅞ |
| 268,235 | 10/- | Hastings and District Elec. Trys Ord. ... ... | ... | ... | 1/32–3/32 | ... | ... | 1/9 | Jan. 5/12 | ... | ... | 1/16 | 1/32 |
| 80,000 | 1 | Do. do. 6% Cum. Pref. .. | 6% | 6% | 1/32–3/32 | ... | ... | 12/6 | June 6 | 8 7 0 | ... | ⅛ | 1/32 |
| 125,000£ | Stk. | Do. do. 4½% Deb. Stk. Red | 4½ | 4½ | 68–73 | ... | ... | 68½ | Aug. 19 | 6 3 3 | April, Oct. | 100 | 68 |
| $9,634,000 | $1,000 | Havana Elec. Rly. Co. Con. Mort. 5% ... ... | 5% | 5% | 94½–98½ | ... | ... | 97 1/16 | Mar. 29 | 5 4 3 | Feb., Aug. | 105 | 80 |
| 195,000£ | 100 | Hong Kong Tramways Co. 5% Mt. Deb. .. | 5% | 5% | 87—92 | + 3 | ... | 89 | Aug. 13 | 5 8 9 | May, Nov. | 92 | 75½ |
| 20,000 | 10 | Imperial Tramways Ord. ... ... ... ... | Nil | 4% year | 3½–4½ | ... | — ½ | 9¾ | Oct. 29/09 | 9 8 6 | Feb., Aug. | 9¾ | 2½ |
| 20,000 | 10 | Do. do. 6% Cum. Pref. ... ... | Nil | 6% year | 6½–7½ | ... | — ½ | 6 3/32 | Ju. 28/09 | 8 5 6 | Jan., July. | 9½ | 2½ |
| 30,000 | 5 | Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref. | 2/6 | Dec. '12 | 2⅛–2⅜ | ... | ... | 46/3 | Nov. 30 | 4 15 3 | *Mar.*,Sept. | 3 | ⅜ |
| 250,000 | 1 | Kalgoorlie Electric Tramways ... ... ... | ... | ... | 1/32–3/32 | ... | ... | 1/– | Jan. 15/12 | ... | *May* | 1/16 | 1/32 |
| 170,000 | 1 | La Plata Elec. Trys. Co. 6% Cum. Pref. ... | 0/4·65 | May, '13 | 1⅜–1 1/32 | ... | ... | 17/6 | July 11 | ... | *April*, Oct. | 1 1/16 | ½ |
| 30,800 | 10 | Lanarkshire Tramways ... ... ... ... | 6/– | 6/- | 9¾–10½ | ... | ... | 10 | May 27 | 5 17 3 | Feb., Aug. | 10 1/16 | 9⅜ |
| 250,000£ | Stk. | Lancashire United Trys. 5% Prior Lien Deb.... | 5% | 5% | 76—78 | ... | ... | 78½ | Mar. 26 | 6 8 3 | Jan., July. | 95 | 76 |
| 634,026 | 1 | Lisbon Electric Tramways Ord. ... ... ... | 7¼d. | 7¼d. | 1⅛–1 1/16 | ... | ... | 22/3 | Aug. 25 | 4 11 6 | *July.* | 1 3/32 | ⅜ |
| 425,553 | 1 | Do. do. 6% Cum. Pref ... | 7¼d. | 7¼d. | 1 1/16–1 1/16 | ... | ... | 22/6 | Feb. 15 | 5 1 3 | Jan., July. | 1⅛ | 1/16 |
| 1,666,673 | 1 | London and Suburban Traction Ord. ... ... | ... | ... | ¼–⅜ | ... | — 1/32 | 5/6 | Aug. 21 | ... | ... | ⅜ | ... |
| 1,316,268 | 1 | Do. do. do. 5% Cum. Pref | ... | ... | 1/16–⅛ | ... | ... | 12/3 | Aug. 21 | 7 5 6 | Feb., Aug. | 1/32 | 1/16 |
| 1,000,000£ | Stk. | London General Omnibus 4½% 1st Deb. ... .. | ... | 4½ | 97–99 | + 5 | ... | 97 | Aug. 28 | 4 11 0 | Jan., July. | 98 | 92½ |
| 1,000,000£ | Stk. | Do. do. 5% Cum. Income .. | ... | 5 | 87—89 | ... | ... | 86½ | Aug. 29 | 5 12 6 | Feb., Aug. | 94 | 87½ |
| 1,649,930£ | Stk. | London United Tramways 4½% 1st Deb. Stk. .. | 4 | 4 | 60—64 | + 1 | ... | 61¾ | Aug. 28 | 6 5 0 | *Jan.*, July. | 63 | 59 |
| 63,430£ | Stk. | Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ... | 5% | 5% | 101—103 | ... | ... | 102¾ | Mar. 7 | 4 17 3 | Jan., July. | 105 | 86 |
| 20,000 | 5 | Do. Do. Do. 6% Cum. Pref. ... | ... | ... | 4¾–5⅛ | ... | ... | 5 1/16 | July 26 | ... | ... | ... | ... |
| 300,000£ | 100 | Manaos Trys. & Ltg. Co. 5% 1st Debs. ... .. | 5% | 5% | 87—89 | ... | — 1 | 87½ | Aug. 1 | 5 16 3 | Jan., July. | 97 | 86 |
| $4,785,000 | $1,000 | Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds. | 5% | 5% | 97—99 | ... | ... | 98¾ | Aug. 29 | 5 4 3 | Mar., Sept. | 104⅜ | 84 |
| 60,000 | 1 | Mansfield & District Trys. Ltd. 6% Cum. Pref. | 7¼d. | 7¼d. | ⅛–1xd | ... | ... | 19/3 | Sept. 5/12 | 6 0 0 | Mar., Sept. | 1 1/16 | ⅜ |
| $16,487,400 | $100 | Mexico Tramways Common Stock ... .. | $3½ | $3½ | 99—101 | + 4 | ... | 98 | Aug. 27 | 7 2 3 | Fb.My.Au.No | 151⅛ | 65 |
| $3,840,000 | ... | Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds | 5% | 5% | 92½–94½ | ... | — 1 | 92½ | Aug. 27 | 5 8 6 | May, Nov. | 101½ | 92½ |
| 600,000£ | 100 | Montreal Street Rly. 4½% Ster. Debs. ... ... | 4½% | 4½% | 97—99 | ... | ... | 98¾ | July 29 | 4 11 0 | Fe.My.Au.No. | 107 | 97 |
| 150,000 | 1 | National Steam Car ... ... ... ... ... | 2/– | year | 1 1/32–1 1/32 | ... | — ⅛ | 27/9 | Aug. 29 | 8 13 0 | Dec. | 39/9 | 18/– |
| 5,000 | 10 | Oldham, Ashton, and Hyde Elec. Tramways Ord. | 7/- | 5/- | 5⅛–6⅛ | ... | — ¼ | 7 | Apr. 2 | 9 16 0 | Mar., Aug. | 9⅜ | 6⅛ |
| 5,000 | 10 | Do. do. do. 5% Cum. Pref. | 5% | 5% | 6⅛–6⅜ | ... | — ¼ | 6⅛ | July 8/12 | 7 17 0 | Feb., Aug. | 8⅛ | 6¼ |
| 77,893 | 5 | Para Elec. Rly. and Ltg. Co., Ord. ... ... | 5/- | 5/- | 6—6½xd | ... | — ¼ | 6 1/16 | Aug. 28 | 7 14 0 | May, Nov. | 8 | 6 |
| 100,000 | 1 | Perth (W.A.) Electric Tramways Ord. ... ... | 6d. | 7¼d. | 1 1/16–1 1/16 | ... | ... | 25/6 | Nov. 8 | 4 7 9 | *Sept.*, Nov. | 26/10½ | ⅜ |
| 245,000 | 1 | Potteries Electric Traction Ord. ... ... ... | 3½ | for '11 | 3/32–1/8 | ... | ... | 7/6 | Aug. 27 | 8 12 3 | April. | ⅜ | ⅛ |
| 245,000 | 1 | Do. do. 5% Cum. Pref. ... | 6d. | 6d. | 1/16–1⅛ | + 1/16 | ... | 12/6 | July 2 | 7 5 6 | *Feb.*, Aug. | ⅜ | 1/16 |
| 124,560 | 1 | Provincial Tramways Ord. ... ... ... ... | 10d. | 8d. | ⅛–⅜ | ... | .. | 14/6 | June 26 | 9 12 0 | May, *Nov.* | 1 1/16 | 13/– |
| 10,000 | 10 | Do. do. 6% Cum. Pref. ... ... | 6/- | 6/- | 9⅜–9⅝ | ... | ... | 9½ | June 26 | 6 8 0 | June, *Dec.* | 11 | 9 |
| 50,000 | 5 | Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref. | 3/- | 3/- | 5–5⅛ | ... | — ⅛ | 5 1/16 | July 17 | 5 9 3 | June, Dec. | 6 | 5 |
| 32,000 | 10 | Shanghai Elec. Construction Co. ... ... ... | 10/- | year | 8½–9⅜ | ... | ... | 9 3/16 | Aug. 15 | 5 5 0 | May. | 11⅛ | 6 |
| 330,400£ | Stk. | Singapore Elec. Trys. Ltd., 5% Debs. Red. ... | 5% | 5% | 85—89 | ... | ... | 87 | July 29 | 5 13 9 | Mar., Sept. | 89 | 61 |
| 169,570 | 1 | S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref. | 1/2⅛ | May. '12 | ⅛–¼ | ... | ... | 15/9 | May 16,'12 | 8 0 0 | Feb., Aug. | 1⅛ | ⅜ |
| 91,720£ | Stk. | Southern Elec. Trys. of B.A., 1st Mt. Deb. ... | 5% | 5% | 93—95 | ... | ... | 94½ | Aug. 7 | 5 4 9 | Feb., Aug. | 100 | 90 |
| 471,500£ | 100 | Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ... | 4½% | 4½% | 98—100 | ... | ... | 99½ | Aug. 20 | 4 11 0 | Feb., Aug. | 104 | 97 |
| 80,000 | 5 | United Elec. Tramways of Monte Video, Ord.... | 3/- | 4/- | 4⅜–5 | + ⅛ | ... | 4⅞ | Aug. 5 | 7 0 0 | *June*, Dec. | 6½ | 4⅜ |
| 90,000 | 5 | Do. do. do. 6% Cum. Pref. | 3/- | 3/- | 4 1/16–5 1/16 | ... | ... | 5 1/16 | June 6 | 5 18 6 | June, Dec. | 6⅜ | 4 1/16 |
| 500,000£ | Stk. | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs. | 4½% | 4½% | 101—103 | + 1½ | ... | 102 | Aug. 11 | 4 9 3 | Apr., Oct. | 109½ | 98½ |
| 40,977 | 5 | Yorkshire (West Riding) Elec. Trys. Ord. ... | ... | ... | ⅜–⅝ | ... | — ⅛ | 5/– | Aug. 15 | ... | *Mar.* | 1⅜ | ⅜ |
| 46,261 | 5 | Do. do. do. 6% Cum. Pref. | 1/6 | 1/6 | 3½–4 | + ⅛ | ... | 73/9 | Aug. 15 | 3 15 0 | *Mar.* | 3⅝ | 1½ |

## ELECTRIC RAILWAY SHARES.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,854,720£ | Stk. | Central London Ord. Stock (4% Guar.) ... ... | ... | ... | 79—81xd | + 2 | ... | 83 | Aug. 26 | 4 18 9 | *Feb.*, Aug. | 89⅛ | 59⅝ |
| 572,640£ | Stk. | Do 4% Pref. Stock ... ... ... | 4 | 4 | 81—83xd | + 1 | ... | 82 | Aug. 29 | 4 16 6 | Feb., Aug. | 92 | 80 |
| 572,640£ | Stk. | Do. Deferred Stock (4% Guar.) ... | ... | ... | 79—81 | + 2 | ... | 81½ | Aug. 27 | 4 19 0 | Feb., Aug. | 91⅜ | 42 |
| 78,000 | 10 | Great Northern and City Pref. Ord. 4% ... | Nil | Nil | 2⅛–2⅜ | + ⅛ | ... | 42/6 | July 24 | ... | *Feb.*, Aug. | 2⅛ | ⅛ |
| 50,000 | 10 | Liverpool Overhead Ord. ... ... ... ... | 2/- | 2/6 | 3¾–4 | ... | ... | 80/- | Aug. 29 | 5 16 3 | *Feb.*, Aug. | 4 | ⅜ |
| 1,412,263£ | Stk. | Mersey Cons. Ord. Stock ... ... ... ... | Nil | Nil | 5⅛–5⅜ | + ⅛ | ... | 5⅜ | July 28 | ... | *Feb.*, Aug. | 8 | 1 |
| 5,732,062£ | Stk. | Metropolitan Cons. ... ... ... ... ... | 1½ | 1½ | 48–48½ | + 2½ | ... | 48 | Aug. 29 | 3 7 0 | *Feb.*, Aug. | 75⅛ | 34 |
| 2,640,914£ | Stk. | Do. Surplus Lands Stock ... ... | 2½ | 2½ | 60–62 | ... | ... | 60 | Aug. 29 | 4 8 9 | *Feb.*, Aug. | 72 | 60⅜ |
| 3,235,000£ | Stk. | Metropolitan District Ord. ... ... ... ... | Nil | Nil | 35½–35⅝ | + 1½ | ... | 35 | Aug. 20 | ... | *Feb.*, Aug. | 51⅛ | 9⅛ |
| 467,000 | 10 | Underground Electric Railways Co. of London | ... | ... | 3⅞–4⅛ | + ⅛ | ... | 80/7½ | Aug. 26 | ... | ... | 5 1/16 | 1⅜ |
| 1,730,000£ | ... | Do. 4½% Bonds of 1933 ... ... ... | 4½% | 4½% | 99—101 | + 3 | ... | 100½ | Aug. 19 | 4 10 0 | Jan., July | 102 | 73 |
| 1,192,707£ | ... | Do. 6% 1st Income Debs. ... .. | 6% | 6% | 109—111xd | + 1 | ... | 111 | Aug. 29 | 5 8 3 | Mar., Sept. | 117½ | 108 |
| 6,120,750£ | ... | Do. 6% Income Bonds ... ... | 60/- | 60/- | 94½–95½ | + 5½ | ... | 95 | Aug. 29 | 6 9 0 | Mar., Sept. | 97⅜ | 18 |

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## FINANCIAL REPORTS.

**Hadfield's Steel Foundry Company.**—The directors recommend an interim dividend of 5 per cent., free of income tax, on the ordinary shares for the past half-year.

**The Bristol Tramways and Carriage Company, Limited.**—The directors have declared an interim dividend at the rate of 4 per cent. per annum for the half-year ended June 30.

**Oldham, Ashton, and Hyde Electric Tramway Company.**—The directors have declared an interim dividend at the rate of 5 per cent. per annum (5s. per share) on ordinary shares for the half-year.

**Liverpool Overhead Railway.**—The directors have declared interim dividends at the rate of 5 per cent. per annum on the preference shares, and 2½ per cent. per annum on the ordinary shares, for the half-year, against 2 per cent. per annum for the corresponding period last year.

**Increased Prosperity at Salford.**—The annual report of the general manager of the tramways, Mr. G. W. Holford, shows that the number of passengers carried was 50,113,120, as compared with 48,720,788 in the previous year. The receipts were £259,704, an increase of £6,389, and the mileage covered was 5,854,830, an increase of 46,461. The earnings per car-mile were 10·645d., and the energy consumption 1·60 units per car-mile, an increase of ·02, attributed to the addition of 20 covered bogie cars. The gross profit was £99,766, to which must be added the sum of £5,659 for interest on investments, etc , making a balance of £105,426.

**Lanarkshire Tramways.**—The general meeting was held in London on July 31, when Mr. A. R. Monks, chairman of the board, who presided, in moving the adoption of the report, said that the traffic receipts for the half-year showed an increase of £6,314, and the expenses an increase of £3,182 as compared with the receipts and expenses for the corresponding half-year of 1912. He referred to the action of the Lanark County Council in proceeding with the construction of tramways from Uddingston to Bellshill, Mossend, and New Stevenston. Part of these would be in operation by the end of August and the remainder by the end of October. The report was adopted.

**Millars' Timber and Trading Company.**—Presiding at the annual meeting, Dr. White said the profit was £157,034, which with the amount brought forward made a total of £186,285. After paying debenture interest, and putting £50,000 to depreciation reserve, there was a balance of £114,128, out of which they proposed to pay 5 per cent. on the ordinary shares, carrying forward £29,201. The volume of business and selling price of their hard wood had been well maintained, but the costs of production had increased. Outside the hard wood business they had done very well, and had acquired two subsidiary businesses. The saw mill plant in the Turkish beech forest near Salonika, though delayed by the war, would soon be at work.

**Sunderland Corporation Tramways.**—For the year 1912-13 the total traffic revenue was £68,507, as against £67,871 in 1912, and the net balance was £13,446, as against £13,063. The traffic receipts had risen from £17,578 in 1898 to £68,507, this figure having only once been exceeded—in 1908, when the receipts were £68,797. After paying interest on capital, £7,228, and income tax, £476, there was a balance of £22,498 to carry to the appropriation account. It was proposed to apply £10,366 to the repayment of loans, £7,218 to reserve and renewals fund, £400 to Wheat Sheaf offices, £352 to capital work, £476 to income tax, and £5,000 for the relief of the rates, this latter contribution making £42,027 given for this purpose since the Corporation took the system over. The amount in the reserves, renewals, and compensation fund was £31,883. The average working expenses per car-mile, including cost of power, amounted to 6·33d.

**Walter Scott, Limited.**—The trading profits for the year ended June 30 were £91,393, and £655 was brought forward. Debenture interest absorbs £12,000, and directors' fees £1,500. A final dividend of 7½ per cent. is proposed on the ordinary shares, making 10 per cent. for the twelve months, adding £24,676 to the reserve funds, writing £6,750 off investments, and carrying forward £1,623. The output at the steel works and collieries considerably improved, but the brick and cement works remained languid owing to the stagnation in the building trade. The trading profits for 1911-12 were £55,552, for 1910-11 £45,536, for 1909-10 £49,537, and 1908-9 £9,830. Twelve months ago two years' dividends were paid on the preference shares and £10,428 reserved. In 1911 and 1910 a year's dividend was paid on those shares, sums of £10,121 and £17,537 set aside, and £5,027 and £1,112 carried forward, but in 1909 no distribution was made, £682 remaining after providing for debenture interest.

**Tyneside Tramways and Tramroads Company.**—The half-yearly meeting was held in Newcastle on August 11, when Dr. J. T. Merz, chairman, who presided, said that there had been an appreciable increase in the revenue and the dividend. The traffic receipts showed an increase of £1,049, and the surplus of receipts over expenses amounted to £5,446. The available balance was £4,864. This has been appropriated as follows: Dividend on preference shares at the rate of 5 per cent. per annum, £601; dividend on the ordinary shares at the rate of 3 per cent. per annum, £2,008; to reserve for renewals, depreciation, etc., £1,200; reduction of registration and formation expenses, £330; leaving £724 to be carried forward. The chairman intimated that the directors had decided to invest the large balance in hand in trust securities to yield 4 per cent. per annum. It appeared from the report that the amount at the credit of reserve for renewals, depreciation, and other contingencies was £14,538.

**Kalgoorlie Electric Tramways.**—Mr. Allen H. P. Stoneham, chairman, presiding at the annual meeting of the Kalgoorlie Electric Tramways, Limited, said that the accounts were not so satisfactory as could be wished, owing in a great measure to the depressed state of business, and to fewer men being employed in the mines. Wages were higher, and, consequently, while the receipts had gone down the expenses had gone up. The manager, Mr. Stanley, worked extremely hard, and was assiduous in his service, but the position was very difficult owing to labour demands. Mr. Stanley was to be highly complimented on the way he had conducted the company's case before the Arbitration Court. They had expected that the trans-continental railway would help them. The work had been commenced, but in a very half-hearted way, and so far it had not benefited Kalgoorlie. They had hopes that before very long the idea of nationalising everything would extend as far as Kalgoorlie, and the Government would make an offer to purchase the tramways in the same way as had been done at Perth.

**Brush Electrical Engineering Company.**—Mr. E. Garcke, who presided at the 24th ordinary general meeting, said that he regretted that the reorganisation scheme had not resulted in at least an equilibrium between the expenses and the receipts. If it had not been for the miners' and other strikes the result of the year's working would have been much better. They were engaged on contracts for the Admiralty at Portsmouth, Chatham, and Rosyth. In pursuance of the policy to keep abreast of the latest improvements in steam turbines, they had identified themselves with the Ljungstrom turbine, a Swedish invention, which had been very carefully worked out and tested. The first set of this type—a turbo-alternator of 1,500 H.P. capacity—was put in service a couple of months ago at the power-house of the North Metropolitan Electric Power Supply Company. They had orders in hand and in immediate prospect for these machines, and were looking forward to a large demand for turbines of this size. On the rolling stock side they had besides the usual standard lines of tramcars and trucks, railway passenger coaches and wagons, turned out considerable numbers of motor-omnibus bodies of different types, but principally for service in the metropolitan area. Practically the whole of the bodies on the blue Metropolitan Electric Tramways omnibuses, which were now running on the London streets, were their make. This was a line of manufacture for which they were specially well equipped, and in which they hoped to continue to do good business. The company were greatly indebted to the managing director (Mr. Broadhurst) and to all the staff for the extraordinary efforts which they were exercising to improve the position of the company.

## CAR REPAIR COSTS.

Some time ago Mr. N. J. Young, general manager of the Newport Corporation tramways department, obtained information in reference to the cost of car repairs on various tramways, and the statement is included as an appendix to his annual report. We give below the figures for the last two years:

| Name of Town. | Total Number of Cars. | | Total Cost of Car Repairs and Maintenance per Car per Annum. | |
|---|---|---|---|---|
| | 1910-11. | 1911-12. | 1910-11. | 1911-12. |
| | | | £ | £ |
| Aberdeen ... ... (14) | 71 | 71 | 35 | 35 |
| Belfast ... ... (8) | 243 | 250 | 61 | 61 |
| Birkenhead ... ... (12) | 59 | 59 | 73 | 79 |
| Birmingham ... (6) | 300 | 460 | 68 | 54 |
| Blackburn ... ... (14) | 61 | 61 | 61 | 69 |
| Bolton ... ... (13) | 106 | 106 | 85 | 113 |
| Bradford ... ... (15) | 237 | 240 | 81 | 88 |
| Burnley ... ... (12) | 57 | 57 | 64 | 67 |
| Cardiff ... ... (9) | 130 | 130 | 46 | 46 |
| Croydon ... ... (11 | 70 | 70 | 78 | 85 |
| Derby ... ... (9) | 47 | 50 | 46 | 53 |
| Dundee ... ... (13) | 66 | 68 | 58 | 54 |
| Glasgow ... ... (12; | 803 | 808 | 57 | 59 |
| Halifax ... ... (15) | 95 | 95 | 51 | 59 |
| Huddersfield ... (12) | 76 | 76 | 125 | 110 |
| Leeds ... ... (16) | 282 | 292 | 84 | 76 |
| Leicester ... ... (9) | 140 | 140 | 72 | 74 |
| Liverpool ... ... (15) | 558 | 572 | 78 | 78 |
| Manchester... ... (12) | 600 | 617 | 96 | 85 |
| Newcastle-upon-Tyne(12) | 190 | 190 | 50 | 65 to 70 |
| Newport ... ... (10) | 44 | 44 | 67 | 85 |
| ,, 1912-1913... ... | 44 | | 94 | |
| Oldham ... ... (11) | 80 | 92 | 97 | 83 |
| Portsmouth... ... (12) | 100 | 100 | 48 | 46 |
| Preston ... ... (9) | 30 | 30 | 94 | 110 |
| Rochdale ... ... (11) | 59 | 59 | 57 | 70 |
| Salford ... ... (12) | 200 | 200 | 68 | 70 |
| Sheffield ... ... (14) | 264 | 269 | 88 | 92 |
| Sunderland ... ... (13) | 70 | 70 | 35 | 39 |
| West Ham ... ... (9) | 118 | 118 | 69 | 77 |
| Wigan ... ... (11) | 67 | 67 | 69 | 69 |
| Wolverhampton ... (13) | 49 | 49 | 47 | 51 |

The figures in brackets are the number of years electric cars have been running.



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## PERSONAL.

**Mr. R. Leigh Griffin** arrived at Southampton on August 9 from Santos on three months' leave.

**Mr. F. P. Seager** has been appointed shift engineer at Manchester at a commencing salary of £175.

**The late Mr. James Watts Courtenay** left estate of the gross value of £85,832; net personalty, £71,064.

**Mr. Robert Hammond** left England on August 30 on a visit to South Africa, sailing on the "Edinburgh Castle."

**Mr. W. E. Read,** of the Burton Corporation Tramways, has had his salary increased from £130 to £140 per annum.

**Mr. V. Hutchinson,** formerly of Hobart, has been appointed electrical engineer to the Brunswick Municipality (Vic.).

**Mr. H. F. Ellis,** electrical engineer, of South Shields, has been granted an increase in salary of £50, to £450 per annum.

**Mr. J. W. Dawson,** city surveyor of Bradford, has been voted an increase in salary of £100, and a further addition of £50 next year.

**Mr. G. B. Wheeler,** of Southport electricity works, has been appointed chief assistant engineer at the Hamilton electricity works.

**Mr. H. Greaves** has been appointed buyer to Ferranti, Limited, in the place of Mr. J. Robinson, who has resigned owing to ill-health.

**Mr. J. H. Cowell,** manager, Blackburn Corporation, has been given an increase of his salary from £400 to £500 by yearly increments of £25.

**Mr. G. G. Deely** has been appointed senior charge engineer at Southport electricity works, and Mr. S. Pendlebury as assistant mains superintendent.

**Mr. L. J. Kettle,** deputy city electrical engineer to Dublin Corporation, has had his salary raised from £400 to £600 by increments of £50 per annum.

**Mr. A. Lees,** a motorman in the Ashton-under-Lyne Corporation tramways department, has been appointed cash clerk and ticket inspector out of a number of applicants.

**Mr. Hamylton Rigg** has resigned his position as sales engineer to the Electrical Power Storage Company, to take up similar duties with Edison Accumulators, Limited, of 49, Old Bond Street.

**Mr. R. S. Pilcher,** general manager and engineer of Aberdeen Corporation Tramways, has been granted an increase of salary from £400 to £450, with further annual increases of £25 to £500.

**Colonel Sir Arthur Yorke,** late chief inspecting officer of railways to the Board of Trade, has been appointed a director of the London, Chatham, and Dover Railway, in the place of the late Mr. G. Wyndham, M.P.

**Mr. T. R. Smith,** chief electrical engineer at Leicester, has been granted an increase in his salary from £600 per annum to £700 as from January 1, 1913, to £800 from January 1, 1914, and to £900 from January 1, 1915.

**Mr. James Dalrymple,** general manager of the Glasgow Corporation Tramways, and Mr. Thomas Nisbet, master of works, sailed for New York on August 9, by the Anchor liner *Cameronia*, with the object of studying American tramway methods.

**Mr. L. C. F. Bellamy,** borough electrical engineer and tramways manager of Ilkeston, has been presented by the employees of the tramways and electricity departments with a pair of handsome copper curbs and fire appliances, on the occasion of his marriage.

**Mr. J. W. Cockrill,** borough engineer, Great Yarmouth, was presented with a silver bowl during the recent conference of the Institution of Municipal and County Engineers in that town by the members of the Corporation and his brother officers in recognition of his election as president of the Institution.

**Mr. G. F. Upcott** has been appointed chief inspector of Walthamstow Council tramways, at a salary of £130, rising by annual increments of £10 to £160 per annum. Mr. Upcott was an inspector on the Leyton Council tramways, and was for a number of years employed by the old North Metropolitan Tramways Company. There were 102 applicants for the position.

**Mr. George Webster,** who has been appointed general manager of the Rochdale Corporation Tramways, will receive a salary of £350 per annum, rising by two annual increases of £25 to £400. Mr. F. Ogden has been appointed chief clerk, Mr. Richard Bentley chief traffic assistant, Mr. Sidgwick rolling stock superintendent, and Mr. George Philipson overhead equipment superintendent.

**Mr. J. R. Mead,** the new borough surveyor of Ipswich, was formerly with the borough engineer of Burton-on-Trent, where he had considerable experience in tramway renewals and extensions. This experience served him in good stead from 1905 to 1911 while holding the position of general engineering assistant to the borough engineer of Birkenhead. From 1911 to the present time he had been deputy engineer of St. Helens.

**Messrs. P. J. McIntosh and W. G. Ross** have been added to the directorate of the Montreal Tramways Company, thus increasing the board from seven to nine members. Mr. McIntosh is in touch with the financiers in New York and Boston, whose association has been so useful to the board. He is also confidential assistant to Mr. W. Rockefeller. In Mr. Ross, who was managing director for many years, the board have the benefit of the advice of one who thoroughly understands the requirements of the company and its patrons.

**Bailie W. B. Smith and Mr. W. W. Lackie,** convener of the Glasgow electricity department and chief engineer of the electricity department respectively, arrived at Montreal on August 24 and proceeded to Toronto to view the generating plant at Niagara Falls. Afterwards they intended to examine several large power-stations at Chicago and thereafter proceed to Pittsburg, where Bailie Smith will attend a conference on smoke abatement. After a visit to the works of the G.E.C. and Westinghouse Companies they will travel to New York to inspect power-stations, arriving at Glasgow towards the end of the first week in October.

**Mr. G. M. O. Scott,** who was selected by the directors of the Ceará Tramway, Light, and Power Company as general manager, is now in Ceará acting as manager for the existing mule tramways during the construction of the new undertaking. He is also employed by the contractors in connection with the latter work, in order to preserve as far as possible, continuity in the technical and business management of the company. It was reported by Mr. C. Hunt, who presided at the annual meeting, that the works were proceeding satisfactorily, and that indications were that the receipts would be more than were originally anticipated by the consulting engineers.

**Alderman Fred Smith,** chairman of the Liverpool Tramways Committee, replying to correspondence evoked by his letter to the newspapers on the report of the Select Committee of the House of Commons on London Motor Traffic, says: "In the days of the horse tramcar in Liverpool one person was killed by that system for each 6,000,000 carried, whilst with the quicker electric service under municipal control for the 10 years ending December 31, 1912, only one person was killed for each 22,000,000 carried. Further, may I add the interesting fact that as the committee gained experience the cost of accidents was practically reduced in 1912 to one-fourth of its cost in 1908."

**Mr. J. S. D. Moffet,** who is vacating the position of manager of the Rochdale Corporation Tramways, to take charge of the West Ham undertaking, has been presented by the employees at Rochdale with a handsome silver double entree dish and a silver hot water jug. Inspector Venting, in handing the gifts to Mr. and Mrs. Moffet, said that the presents were a token of the respect which the employees felt for Mr. Moffet, who had been manager since 1904. In replying, Mr. Moffet said that the system had grown into a large and important undertaking, and he was proud of all branches of the service. He was glad to think that, in spite of any dispute which had arisen during his management, there had always been a good feeling between himself and the employees. Several other speakers referred appreciatively to Mr. and Mrs. Moffet's interest in the various branches of the undertaking.

**Mr. A. T. Lambert,** general manager and electrical engineer, Maidstone Corporation Tramways, was made the subject of complimentary remarks at the opening of the new offices at the Barming depot on August 15. Councillor Lyle, chairman of the committee, in the course of observations made in calling upon the Mayor to open the new premises, observed that the offices had already paid for themselves in that the manager had, since their erection, always been on the spot, and able to direct the men of the depot in their work. Mr. Lambert worked hard to make the tramways a success. There were managers who could not tell the men in the workshop what to do, but Mr. Lambert was not a manager of that stamp. He not only knew how to do the work but showed the men how to do it. The Mayor (Councillor Potter) agreed that in Mr. Lambert they had a clever engineer, and one who thoroughly understood his work. The Council wanted him, with the chairman of the committee, to be master of the whole concern.

**Mr. George Herman Anger,** managing director of the Anger Manufacturing and Supply Company, of Bank Chambers, Preston, will sail for New York on October 4 by the "Lusitania." The Anger Company are the manufacturers of the Anger improved automatic brake adjuster, a device which is now in use on 125 tramways representing nearly every country of the world. Mr. Anger goes to the United States to attend the convention and exhibition of the Electric Railway Association of the United States, which will be held at Atlantic City from October 11 to 19. The Anger brake adjuster will be shown there by the Ackley Brake and Supply Company of Church Street, New York City, the sole manufacturers and selling agents for the Anger improved automatic brake adjuster in U.S.A., Cuba, Porto Rico, Mexico, Central America, Venezuela, the Phillipine Islands, and the West Indies. After the convention Mr. Anger will visit various tramways in Canada, making his head-quarters at the company's Toronto office, and will return to England about November 1.

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**Bombay Tramways Officials.**—Sir Charles Ollivant, who presided at the annual meeting of Bombay Tramways and Electric Supply Company, remarked that the company were greatly indebted to the experience, ability, and zealous supervision of the managing director, Mr. Rimington, and no less fortunate in having had a chief engineer with the conspicuous professional attainments and business ability of Mr. Cooper. As the principal local representative of the company, his unfailing tact and courtesy had been appreciated by all, and, under the direction and influence of these leaders, a very efficient staff had been organised, whose excellent service merited warm approbation. It gave the directors great pleasure to see present one of the officials who had been associated with the undertaking from its commencement. He was highly appreciated by the managing director of the old horse tramway company, and had since been appreciated highly by Mr. Rimington, he referred to Mr. Pestonji Mahaluxmiwala. A dividend of 5 per cent. on the ordinary shares, free of English income tax, was declared.

**Mr. T. B. Goodyer,** general manager, Croydon Corporation Tramways, has on several occasions received commendation for the work he has accomplished for the tramway undertaking against the competition of the motor omnibuses. In 1909-10 the latter vehicles were inferior to those now in use, and on the London tramways being extended to the Croydon boundary the omnibuses gave up the fight. Now the vehicles of the London General Omnibus Company, the British, and the Metropolitan Electric Tramways Companies are working the main London and Croydon route under the direction of the first-named, while from East London the petrol-electric vehicles of Thos. Tilling, Limited, make further competition for the tramways. Councillor Denning, chairman of the Tramways Committee, in moving the adoption of the manager's report for the year 1912-13 at a recent meeting of the Council, remarked that Mr. Goodyer started the document by saying he had great pleasure in submitting the annual report. Mr. Goodyer might have said he had pleasure and pride in submitting it. The report did him very great credit. He doubted if a more exhaustive or a more reasonable report, dealing with the matter from every point of view, had been presented to that Council. No man could be more receptive of ideas, more interested in his work, or more desirous of doing everything he could for the department than Mr. Goodyer.

## NEW AND PROSPECTIVE WORK.

CANADA.—It is reported from Canada that the Canadian Pacific Railway is about to commence the construction of an electrical line from Hamilton to Niagara Falls. By its construction the Canadian Pacific Railway will be in a position to handle traffic direct from Hamilton to Buffalo on their own lines, and it will be no longer necessary to run traffic over the routes of other companies.

DONCASTER.—The Town Council have agreed to purchase six additional tramcars at an estimated cost of £5,000, and to enlarge the car shed at a cost of £750. The question of buying six or eight motor omnibuses to run between Doncaster and outlying districts is being considered.

DUBLIN.—The Tramways Company have decided to at once relay some of the lines which they had not intended to proceed with until next year. The reason for the decision is the greater dearth of employment in the city for casual labour.

DUNDEE.—The Tramways Committee have authorised the manager, Mr. Peter Fisher, to obtain tenders for four additional cars, in view of the extension of the tramways to Broughty Ferry, and to equip all the cars on the system with wire mats, at a cost of £3 18s. per car.

DUNFERMLINE.—The Dunfermline District Tramway Company have decided to carry their tramway system through Dunfermline to the western boundary of the burgh. When the company obtained their powers it was a condition that they pay the Corporation £100 per mile in respect of the upkeep of the tramway track. As an incentive to the company to carry out the extension the Council have agreed to reduce the payment to £60 for a period of five years.

FELIXSTOWE.—Mr. H. R. Hooper, on behalf of the Local Government Board, has held an inquiry into the application of the Felixstowe Urban District Council for sanction to borrow £4,729 for the extension of the electric supply plant, by the provision of a 150-KW. Diesel generating set. The inspector elicited the fact that the Diesel set was required to supersede some old gas engines, and after discussion it was decided to amend the application, the sum asked in revision being £2,800.

IPSWICH (QUEENSLAND).—The Iron and Coke Company propose to install electric tramways, and to erect a power-house at West Ipswich to supply current for lighting and power purposes to private consumers.

KILKENNY.—The scheme for a broad gauge railway from Castlecomer to Kilkenny to serve the projected coal mines has given place to a proposal for the construction of a light railway instead at an estimated cost of £40,000, including rolling stock. The line is to be laid alongside the public road, taking 4 ft. off the present width of 26 ft., the rails to be protected by a kerbing raised from six to nine inches on each side. Mr. Ryan is the engineer.

LEEDS.—The Leeds Sub-Tramways and Electricity Extension Committee has recommended that application should be made for power to carry out a number of tramway and railless trolley route extensions. The estimated cost of these is £190,000.

MORECAMBE.—The Town Council on August 19 agreed that the electrical engineer should prepare a scheme for the electrification of the tramways.

NORTHAMPTON.—A scheme has been arranged for the extension of the tramways to the Far Cotton suburb as soon as the work of reconstructing the South Bridge has been completed in the near future and Bridge Street has been widened.

READING.—The Council have decided to promote a railless trolley bill in the next session of Parliament.

ROTHERHAM.—The Council have accepted the tender of Chadwick and Company for the extension of the car sheds in Rawmarsh Road at £11,643. The Council propose to apply to the Board of Trade for a Provisional Order authorising the construction of electric tramways along the new street in Millgate and adjoining streets, so as to connect the route with the present tramways.

SOUTH SHIELDS.—£30,000 is to be borrowed by the Corporation for the purpose of installing a new generating set and other plant at the electricity works.

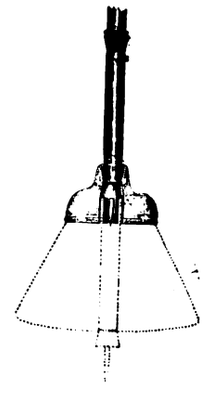
STIRLING.—The Council have decided to consider a proposal made by Mr. George Balfour, of Messrs. Balfour, Beatty, and Company, London, to acquire the Stirling and Bridge of Allan Tramways and to apply for powers to enable them to reconstruct and electrify the lines. Mr. Balfour states that he could only carry out the scheme on condition that he was able to acquire the electricity works from the Corporation, when he would reduce the charge for domestic and public lighting.

WELLINGTON (N.Z.).—The tramways department's estimates for the current year provide for an expenditure of £34,800 on new works, including £9,264 for new cars, £5,020 for a new boiler and other plant for the power-station, and £5,164 for car shed extension.

WIGAN.—The Tramways Committee propose to ask the Council to sanction the borrowing of money for the purpose of buying six up-to-date cars.

## A CAR "TIDY."

Messrs. Leopold, Turners, and Workers, 124-7, Leopold Street, Birmingham, have brought out an excellent device which will come as a "boon and a blessing" not only to tramway conductors, but to those who ride in the cars. At present, and until used tickets are systematically and rigidly collected, they litter the cars, and it is anything but pleasant to come into one where these dirty bits of cardboard almost cover the seats and the floor on which they have been shuffled about by dirty boots. It is a still more unpleasant task to collect them with the fingers, and it is no wonder that the filthy task is shirked by the men, and that their hands are often so grimy as to be positively disgusting. The "tidy" we illustrate will obviate all these evils, for it can be used as a brush, and also as a rag-pick to collect all refuse, not only in and on the cars themselves, but in waiting rooms, shelters, heavy unloading stations, car sheds, etc. The price is only 5s., including carriage to any part of the United Kingdom.



## HOBART MUNICIPAL TRAMWAYS.

The Hobart (Tasmania) tramway system, which has been taken over by the City Council, was constructed by Messrs. Siemens Brothers and Company, and was described in the TRAMWAY AND RAILWAY WORLD of January, 1895. The present manager, Mr. A. C. Parker, went out as the representative of Messrs. Siemens Brothers, and under his supervision the first cars started running in November, 1893. In the following year the undertaking was handed over to the Hobart Electric Tramway Company. The service was begun with about 20 cars, of which 10 are still in service. The power-station equipment has been extended, and during the last four years two 300 KW. sets have been installed, with one of the latest Babcock and Wilcox tubular boilers, with automatic stoking appliances. During the whole of the 20 years that the line has been in operation only one fatal accident has occurred, a record which probably has not been equalled in the history of electric tramways.

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## CONTRACTS AND ORDERS.

**Vickers, Limited,** have an order for 125 tramcar wheel tyres from Sheffield Corporation.

**Mr. G. F. Tomlinson** has received a contract for doubling tramways at Derby, at £2,632.

**Chamberlain and Hookham, Limited,** have received a contract from Falkirk for A.C. meters.

**Bayliss, Jones, and Bayliss, Limited,** have an order for tie bars from Salford Corporation Tramways.

**C. Richards and Sons** have an order from Salford Corporation for single-ended tie bars for tramways.

**The Electric Construction Company, Limited,** have received an order for a booster from Bolton Corporation.

**Walter Scott, Limited,** are supplying steel rails and fish plates for relaying the track in Manchester Road, Bolton.

**Doncaster Tramways Committee** have accepted the tender of Arnold and Son, at £2,524, for extending the car shed.

**Peterborough Council** have allotted a contract to Crompton and Company, Chelmsford, for a new switchboard, at £576.

**Eccles Council** have awarded a contract to the Triumph Stoker, Limited, to equip four boilers with their mechanical stoker.

**W. S. Laycock, Limited,** have supplied rollers and blinds to Walsall Corporation for cars now being fitted with vestibules.

**Watlington and Company, Limited,** have an order from Stockport Corporation Tramways Committee for pressed-steel gear cases.

**Chamberlain and Hookham, Limted,** have received a contract from Rotherham for meters of 10 amperes capacity and upwards.

**Sheffield Corporation** have placed an order with Messrs. Longbottom and Company for coal for the generating station at 9s. 11d. per ton.

**Siemens Brothers and Company, Limited,** will supply a high-tension switchboard to Bexley Urban District Council, at a price of £867.

**Hillman Motor Car Company** have obtained a contract to supply a motor lorry to the electricity department of Willesden Urban Council.

**Keighley Council** have accepted the tender of Ed. Bennis and Company for the supply and erection of a Bennis stoker to a Lancashire boiler, at £130.

**Huddersfield Council** have placed contracts with J. Proctor, Limited, for a coal elevator, and with J. Moody and Son for a hydraulic hoist.

**Crompton and Company, Limited,** are supplying a direct-current switchboard at Salisbury Road sub-station for the Willesden District Council.

**The United Electric Car Company, Limited,** have received an order for two top-deck covers for tramcars from Lancaster Tramways Committee.

**Glasgow Council** have accepted the tenders of the Lorain Steel Company and Hadfield's Steel Foundry Company for the supply of special trackwork.

**The Electric Construction Company** have received a contract from Blackburn Corporation for the supply of electric motors for the electricity department.

**The Atlas Resilient Road Wheel Company, Limited,** have received an order from Stockport Corporation for a set of spare wheels for trackless trolley vehicles.

**Tudor Accumulator Company, Limited,** have obtained a contract for the repair and maintenance of the battery at the Heywood Corporation electricity works.

**The Belfast Tramways and Electricity Committee** has accepted the tender of Bertram Thomas, of Manchester, for a switchboard panel for the electricity works.

**A. Graham and Sons,** of Longroyd Bridge, have received a contract for the widening of Long Wall, Huddersfield, in connection with the West Vale tramway extension.

**Edgar Allen and Company, Limited,** are to supply six 15 ft. lengths of manganese rail, with fish plates, bolts, etc., for a section of the Temple Mills curve of the Leyton tramways.

**Newport Council** have accepted the tender of Mr. Bertram Thomas for the supply of switch gear at £168, and of Mr. R. W. Moon for the erection of a switch and motor house, at £599.

**Bolton Electricity Committee** has accepted the tender of Stewarts and Lloyds for steam and hot water pipes for their new station, and of Wm. Pollett and Company for the laying of conduits.

**The Lea Recorder Company, Limited,** will supply and erect a combined indicator and recording water meter, including tank and float chamber, for Sheffield Corporation. The contract amounts to £880.

**Manchester Corporation Tramways Committee** have accepted tenders for tramcar trucks from the Brush Electrical Engineering Company, and for tramcar wheel centres from Edgar Allen and Company.

**The British Insulated and Helsby Cables, Limited,** have a contract from Burnley Corporation for the supply of cables. They are also supplying 6,000-volt overhead three-phase line to Halifax Corporation.

**The Brush Electrical Engineering Company's** tender for 25 double-deck top-covered extended canopy cars has been accepted by Sheffield Corporation at £640 per car, plus 5 per cent. for contingencies.

**Messrs. J. W. Courtenay, Limited,** of London, have been awarded the contract for the advertising on the cars of the Aberdeen Corporation Tramways for the ensuing five years. It was stated that the tender of Messrs. Courtenay, Limited, was the highest of the offers received.

**John Taylor,** of 7, Strand Street, Liverpool, has received orders from Manchester Corporation for 120 tubular sanding devices, and from the Brush Electrical Engineering Company for 100 tubular sanding devices for use on the new cars they are now building for Sheffield Corporation.

**Burnley Corporation** have accepted the tender of the British Westinghouse Electric and Manufacturing Company for a turbo-alternator, rotary converters, switch gear, etc., at £12,860, and the tender of the Electrical Company for 70 tramcar watt-hour meters mounted on special spring frames.

**Aberdeen Council** have accepted tenders as follow: For the clothing of the tramway employees for the next two years: Uniforms, Moore, Taggart, and Company, Glasgow; hats, Perry and Company, Halifax; inspectors' waterproofs, the London Rubber Company; motormen's waterproofs, Steele and Company, Aberdeen.

**Sunderland Council** have placed contracts as follow: Hadfield's Steel Foundry Company, relaying a manganese railway and tramway crossing; Tudor Accumulator Company, Limited, welding 500 tramway rail joints; British Insulated and Helsby Cables, Limited, and I.R. and G.P. Company, cables; Ferranti, Limited, meters.

**Chesterfield Council** have placed contracts as appended: Marsden Brothers, sub-station, Whittington Moor, £205; Chas. Ross, Limited, girders for switch gallery, £44; B.I. and Helsby Cables, Limited, 1,200 yards low-tension triple-concentric armoured cable, £294; Brush Electrical Engineering Company, Limited, two trailer car bodies, £80 each.

**The Railway Track Supply Company of Great Britain,** 81, Gracechurch Street, London, E.C., have recently received an order for 20,000 "Vaughan" rail anchors for the South Manchurian Railways. They have a large number of orders on hand all over the world for these rail anchors, for which they hold the sole licence to manufacture and sell in Great Britain and the British Colonies.

**Warner Trucks.**—The M. and G. Truck and Engineering Company, British licensees for the Warner non-parallel axle truck, have received three repeat orders from the Colombo tramways for vehicles of this class. The first car of the kind, which was sent out in 1910, and was illustrated in our issue of January, 1913, has proved completely satisfactory, and is noted for smooth running and reliability.

**London County Council** have accepted the following tenders: Dick, Kerr and Company, reconstruction of horse tramways in Ball's Pond Road at rates contained in a previous tender; Spagnoletti, Limited, switch gear for Shoreditch, Camberwell, and Woolwich sub-stations and the central car repair depot, £999 14s.; Frederick Smith and Company, five miles of 4/0 grooved trolley wire, £93 6s. 8d per mile (or £81 13s. 4d. per ton), less 2½ per cent. discount.

**Bradford City Council** has accepted the following tenders as extensions of, and at the same prices as, existing contracts: Siemens Brothers Dynamo Works, Limited, 100 tramway motors, 50 resistance sets, and 100 circuit breakers; Dick, Kerr and Company, Limited, 100 D.B. form K4 tramway controllers; Hurst, Nelson, and Company, Limited, 50 tramway trucks; Cole, Marchant, and Morley, 50 power brake sets; Collier Brothers, 30 miles 0000 grooved copper trolley wire, at £2,698.

**Johnson and Phillips, Limited,** have secured the following orders for their standard type oil-cooled transformers during the last few weeks: Two 625 k.v.a., 6,600 v., for Dundee Corporation; two 150 k.v.a., 6,000 v., for Wigan Corporation; one 500 k.v.a., 6,600 v., for Oldham Corporation; three 100 k.v.a., 2,000 v., for the Admiralty; fifty-one 50 k.v.a. and three 300 k.v.a., 13,200 v., for Canada; four 400 k.v.a., 10,000 v., for Japan; two 350 k.v.a., 6,000 v., for Brazil. The Company have also secured contracts for upwards of 5,000 k.v.a. in transformers for English machinery makers in connection with converting plants, etc.

**First-class Cars to the Theatre.**—Patrons of the first-class cars in Liverpool are appealing for more cars, so that they can get to and from the theatres. Most of the first-class cars cease running at eight at night.

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## TRAMWAY AND LIGHT RAILWAY NOTES.

**BIRMINGHAM.**—There is a suggestion that the Corporation should follow the example of Dresden and put trailers on some of the tramcars for the purpose of carrying luggage. The chairman of the Tramways Committee explains that any such scheme would have to be carefully prepared and organised, and he fears that luggage trailers would cause delay.

**DUBLIN.**—Without discussion the Dublin Corporation on August 18 adopted a resolution, drawn up in the best debating society style, instructing the law agent and the town clerk to report on the steps to be taken in order to acquire the tramways undertaking.

**GLASGOW.**—The Corporation is considering the appointment of a special committee, which will be charged with the duty of reporting on a scheme of electric tube railways between the east and west of the city. Assuming that there are no further extensions, the tramways will be free from debt within four years. After this time the annual surplus should be a very large one, amounting from £200,000 to £400,000, and a writer in the *Glasgow Evening News* asks how this large sum will be disposed of. Hitherto very liberal allowances have been made to the depreciation and reserve accounts, so that no less a sum than £2,040,000 stands at the credit of the depreciation and permanent way renewal funds. Of that amount £1,852,500 is invested with the Common Good.—Consideration was given by the City Council on August 14 to a recommendation by the Tramways Committee that application be made for Parliamentary powers to enable them to remove obstructions from the tramway lines, and where it could be shown that the obstruction was due "to the overloading of the vehicle, or to negligence in the construction or maintenance thereof," for powers to charge for the cost of the removal, and the loss occasioned by the interruption. On a motion to disapprove of the recommendation being proposed and seconded, Bailie Alston said the committee were only seeking powers to recoup themselves for having to bring the apparatus for removing obstructions from the depot. It was in the interests of other users of the streets that obstructions should be removed as speedily as possible. The minute was disapproved by a large majority.

**GREENOCK.**—Councillor Mitchell has given notice to move at the next meeting of the Corporation that the town clerk give due and further notice to the Greenock and Port-Glasgow Tramways Company that the Corporation have decided to exercise the option they are entitled to in terms of the lease to terminate such lease on the first break namely, May 15, 1914.

**LIVERPOOL.**—Representatives of the Glasgow tramways recently visited Liverpool and inspected the car designed by Mr. Mallins, having a separate entrance and exit on the platform. A Glasgow journal says: "It is understood that the Liverpool management is delighted with the experiment, and that at least a score of the new cars have been ordered. Nevertheless, it is a moot point whether the latest type would suit the unrivalled rushes which are made at the car stations in central Glasgow at least." The cars were described and illustrated in our issue of November 12, 1912.

**LONDON.**—One of the provisions of the London County Council Tramways Bill, 1913, would have allowed them to charge up to a maximum of one penny per mile over their whole system, and any fraction of a mile may be deemed a mile. Giving evidence in support of the proposal, Mr. Fell, chief officer of the tramways, stated that if the Council got the power they sought they did not propose to charge the maximum fares. They were now the cheapest carriers in the London area, and they had halfpenny fares and very cheap workmen's fares on all their sections. As an example of this, he gave the instance of a 19-mile ride for twopence from Tooting to Hop Exchange and back. An agreement having been arrived at under which no alteration would be made in the existing rate of a penny for from 3½ to 5 miles on the lines to be taken over from the London United Tramways Company, the clause was allowed.—Progress is being made with the work of fixing route numbers, with the necessary equipment for illumination at night, on the electric cars of the London County Council. The back portion of the illuminated boxes is being utilised as advertisement spaces.

**MANCHESTER.**—The number of tramway passengers in Manchester on the occasion of the recent Royal visit amounted to 825,703, the receipts constituting a record, with the exception of August 3, 1908, when the takings were £4,144, and the passengers 698,013. Mr. J. M. McElroy, the general manager, has explained that the reason why the receipts were lower, although the number of passengers was higher, is due to the fact that there had been considerable reduction in the fares throughout the service. The figures for Monday, July 14, when the King visited Manchester, are the more remarkable, because for several hours during that day traffic in the centre of the city was stopped entirely, and the 110 cars were engaged in carrying school children to special stands. The number carried on that day was more than the entire population of Manchester, which, according to the last census return, was 714,333.

"PEACOCK" BRAKES.

(PATENT).

| | |
|---|---|
| MANCHESTER - - | 618 |
| BIRMINGHAM - - - | 442 |
| SALFORD - - - - | 326 |
| LONDON area - - - | 562 |
| Total for the 4 cities - | 1,948 |

The "Peacock" Brake Co.,

27, Clements Lane, LONDON, E.C.


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## THE MUNICIPAL TRAMWAY CONFERENCE.

The programme for the twelfth annual Conference of the Municipal Tramways Association, to be held in Sheffield from September 23 to 26, was issued just as we were going to press Omitting visits, excursions, etc., the following are the main items of the programme:

**TUESDAY, SEPTEMBER 23.**

8 p.m. Informal reception at the Royal Victoria Station Hotel.

**WEDNESDAY, SEPTEMBER 24.**

10 a.m. Meeting of the Executive Council.

10-15 a.m. Reception by the Lord Mayor and the Chairman of the Sheffield Tramways Committee.

10-30 a.m. Conference:

Presidential Address by Mr. A. R. Fearnley, general manager, Sheffield Corporation Tramways.

Paper: "Advantages and Disadvantages of Platform Fare Collection," by Mr. Alderman S. Flint, chairman, Leicester Corporation Tramways Committee.

1 p.m. Luncheon at the Grand Hotel, at the invitation of the Tramways Committee.

2-30 p.m. Resumption of Conference:

Paper: "The Maintenance of Paving on Tramway Track as affected by Section 28 of the Tramways Act, 1870," by Mr. Councillor W. C. Fenton.

10-30 p.m. Supper at the Town Hall on invitation of Lord Mayor.

**THURSDAY, SEPTEMBER 25.**

9-45 a.m. Meeting of the Executive Council.

10 a.m. Meeting of the Managers' Section.

10-30 a.m. Conference resumed:

Paper: "Urban Passenger Transport" by Mr. J. B. Hamilton, general manager, Leeds Tramways.

12-45 p.m. Luncheon at the Royal Victoria Station Hotel, at the invitation of the Tramways Committee.

2-30 p.m. Visits to Works.

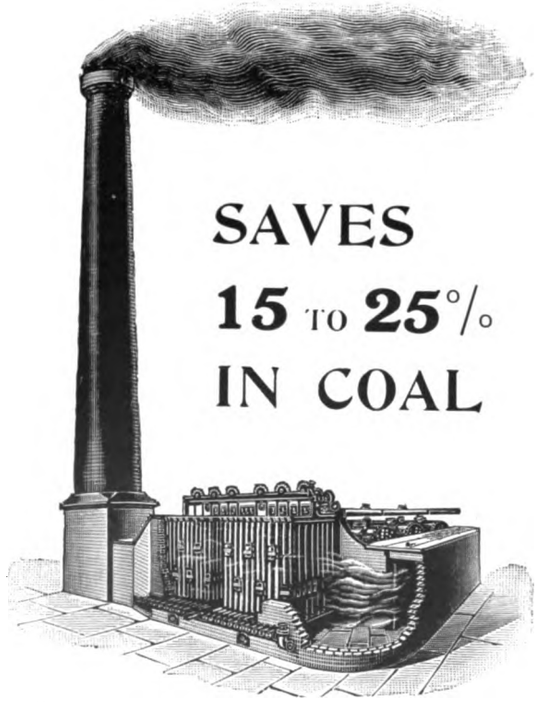
7-0 p.m. Annual Association Dinner at Victoria Station Hotel.

**FRIDAY, SEPTEMBER 26.**

9 a.m. Meeting of the Executive Council.

9-30 a.m. Annual Business Meeting.

GREEN'S ECONOMISER



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## PATENT LIST.

**Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.**

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS.

Applications for Letters Patent have been filed:

17,244 Motor omnibus life-guard—W. Knott.
17,257 Rail joints—C. Deppisch.
17,258 Vehicle wheels—C. Deppisch.
17,346 Life-guard for motor omnibuses, trams, etc.—R. Gribbin and R. Steward.
17,354 Motor omnibus guard—H. Luke.
17,357 Life-guard for motor omnibuses—J. E. Madsen.
17,540 Life-guard for motor omnibuses—A. H. Wilde.
17,607 Electrical systems—R. Varley.
17,618 Superheaters—J. H. Stirling and Schmidt's Superheating Company, Limited.
17,625 Generation of electrical power and systems of electrical transmission of same—W. P. Durtnall.
17,628 Life-saving apparatus for motor omnibuses—J. Joseph.
17,671 Life-saving apparatus for motor omnibuses—E. Harnett.
17,850 Trolley wheels—J. W. Anderson.
17,870 Metal railway ties—C. Anderson.

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"The oilskin coats we now use are entirely confined to the 'Ailsa' manufacture."
"We have tried several makes of Oilskins, but none have been equal to the 'Ailsa' make."
"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

J. H. Butcher & Co.
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17,917 Life-guard for motor omnibuses—P. Beston.
17,936 Car trucks—H. H. Hewitt.
17,940 Car trucks—H. H. Hewitt.
17,946 Car fenders—F. A. Nelson and E. T. Flateboe.
18,008 Train electric control systems—B. Starie.
18,019 Automatic signalling and alarm systems for railways—O. M. de Munnick.
18,106 Supplying current for electric devices for setting points of electric railways with sliding bow and roller bow arrangements—G. Breucker.
18,128 Railway safe running devices—A. R. Angus.
18,136 Railway rail joints—L. W. Williams.
18,181 Construction of omnibuses and tramcars—C. F. Newman.
18,210 Working of tramway and like vehicular systems—P. H. Carter.
18,250 Trolleys for electric tramcars—H. H. S. Farmer.
18,287 Guard for tramcars—S. Cromarty.
18,316 Fluid pressure braking apparatus for electric railways—J. W. Cloud.
18,345 Automatic air-brake apparatus—W. D. Aird.
18,485 Motor omnibuses—J. A. Hope.
18,544 Reinforced concrete beds or sleepers for permanent way—J. Rank, F. Rank, and L. Rank.
18,601 Double-decked cars—L. Spangler.
18,602 Double-decked cars—L. Spangler.
18,664 Vacuum brake apparatus—E. S. Luard.
18,684 Seats for trams and motor omnibuses—A. L. Barber.
18,695 Arresting the side slipping or skidding of motor omnibuses—W. H. Knowles and W. F. Goreham.
18,723 Rail joints—J. E. McCoy and W. H. Bowersot.
18,790 Construction of anti-friction mechanism as applied to axle shafts of tramcar trucks—J. E. Cooper.
18,814 Guards for motor omnibuses—F. J. Zelzer.
18,882 Railway switch operating apparatus—L. W. Williams and O. R. Williams *(A. Lines and C. B. Lines)*.
18,914 Sleepers for railway tracks—L. Beyer.
18,916 Appliance for the protection of exposed seats on omnibuses—G. D. Sweetman.
19,019 Train signalling and control systems—F. W. Prentice and B. Starie.
19,020 Train signalling and control systems—F. W. Prentice and B. Starie.
19,056 Safety guard for motor omnibus front steering wheels—J. Pinder.
19,076 Seats for omnibuses and tramway cars—H. F. Keen.
19,101 Rail joints—M. Surtig, J. Briar, and J. Meno.
19,144 Automatic stopping railway trains—G. H. Hallett, junior.

## Specifications Published.

1912.

16,501 Brake apparatus for railway vehicles—Luard.
23,371 Axle bearings—Stephens.
13,695 Contact fingers for electric controllers—Dyer.
16,534 Track apparatus for operating railway signals—Ducellier and Guillou.
16,851 Railway motor coaches—Thomas and Thomas Transmission, Limited.
19,612 Railroad ties and braces—Borger.
25,111 Rail joints—Blessing.
17,671 Compound railway rails—Weeber.
18,209 Means for securing rail wedges in railway chairs—Jones.
20,446 Electric traction systems—Pollak *(Electro-Motoren-Werke Hermann Gradenwitz)*.
24,384 Joints of switches for overhead trolley ways—Straiton.
26,145 Devices for electrically operating tramway points—Davidson.
17,130 Electric power transmission—Thomas and Thomas Transmission, Limited.
17,306 Control of electrically-operated self-propelled vehicles—Van Daalen and Schreiber.
17,699 Locomotives—Lipetz and Magid.
17,749 Method of and apparatus for electric welding—Haddan *(Cleveland Welding and Manufacturing Company)*.
19,458 Bodies of motor omnibuses—Crane and London General Omnibus Company.
29,683 Steam superheating—De Ferranti.

1913.

3,380 Rail joints—Vietor.
5,092 Automatic train control and signalling system—Kerr.
5,210 Street cars—Hedley and Doyle.
1,179 Method of and apparatus for uniting railway and tramway rails—Th. Goldschmidt Akt.-Ges.
2,811 Apparatus for sanding railway and tramway rails—Lambert.
7,556 Car brakes—Rochambeau.
12,841 Power transmission and control apparatus on motor vehicles—Thomas and Thomas Transmission, Limited.
3,371 Trolley wheels—Anderson.
6,504 Journal boxes for railway vehicles—Berg.
7,094 Rail joints—Barnhill.

# TRAFFIC RETURNS.

## TRAMWAYS AND OMNIBUSES.

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | 1913. WEEKS ENDING. | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aug. 3. | Aug. 10. | Aug. 17. | Aug. 24. | Aug. 2. | Aug. 9. | Aug. 16. | Aug. 23. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Aberdeen Corporation | 1,560 | 1,646 | 1,796 | 1,668 | 1,863 | 2,031 | 1,908 | 1,861 | 12 | 20,589 | + 1,332 |
| Ayr Corporation | 462 | 473 | 550 | 414 | 595 | 706 | 543 | 588 | 14 | 7,342 | + 683 |
| Bath Electric | 947 | 1,287 | 1,062 | 994 | 1,289 | 1,615 | 1,179 | 1,448 | 34 | 32,626 | + 2,257 |
| Birkenhead Corporation | ... | .. | 1,168 | 1,142 | ... | ... | 1,290 | 1,274 | 21 | 27,340 | + 2,842 |
| Birmingham Corporation | 10,510 | 10,402 | 9,774 | 10,619 | 11,410 | 11,384 | 10,637 | 11,261 | 21 | 238,554 | + 16,936 |
| Blackburn Corporation | 1,210 | 1,212 | 1,224 | 1,149 | 1,498 | 1,390 | 1,332 | 1,318 | 21 | 28,107 | + 2,419 |
| Blackpool and Fleetwood | 1,486 | 2,545 | 2,382 | 1,914 | 1,899 | 3,131 | 2,809 | 2,326 | 21 | 15,724 | + 2,100 |
| Blackpool Corporation | 2,681 | 4,696 | 4,206 | 3,982 | 3,683 | 5,786 | 5,062 | 4,962 | 20 | 47,213 | + 6,013 |
| Bolton Corporation | 2,611 | 2,722 | 2,624 | 2,533 | 2,841 | 2,781 | 2,715 | 2,725 | 21 | 57,596 | + 2,766 |
| Bournemouth Corporation | 2,846 | 2,638 | 2,550 | 2,590 | 3,528 | 3,174 | 3,280 | 3,031 | 21 | 48,501 | + 5,604 |
| Bradford Corporation | 5,515 | 5,710 | 5,766 | 5,498 | 6,549 | 6,365 | 5,989 | 6,207 | 21 | 126,204 | + 7,151 |
| Brighton Corporation | 1,309 | 2,151 | 1,294 | 1,295 | 1,594 | 2,570 | 1,592 | 1,537 | 21 | 25,186 | + 1,183 |
| Bristol | 7,595 | 8,711 | 7,197 | 7,251 | 9,101 | 11,619 | 8,681 | 9,070 | 33 | 268,688 | + 37,596 |
| British Elec. Trac. Co's. Undertakings— | | | | | | | | | | | |
| Airdrie | 282 | 281 | 337 | 320 | 319 | 358 | 357 | 402 | 34 | 11,517 | + 1,677 |
| Barnsley | 165 | 193 | 230 | 256 | 362 | 391 | 393 | 404 | 34 | 9,428 | + 3,534 |
| Barrow | 478 | 516 | 503 | 458 | 598 | 676 | 538 | 506 | 34 | 13,944 | + 952 |
| Birmingham and Mid. Joint Com.: | | | | | | | | | | | |
| Birmingham and District | 961 | 1,199 | 945 | 958 | 1,007 | 1,296 | 912 | 975 | 34 | 24,122 | + 1,466 |
| Dudley-Stourbridge | 1,011 | 1,576 | 1,181 | 980 | 1,126 | 1,845 | 1,132 | 1,063 | 34 | 32,672 | + 2,732 |
| South Staffordshire | 949 | 1,269 | 962 | 988 | 1,034 | 1,318 | 959 | 1,020 | 34 | 33,789 | + 2,294 |
| Wolverhampton District | 493 | 693 | 447 | 513 | 539 | 779 | 500 | 557 | 34 | 17,555 | + 1,319 |
| Devonport | 583 | 670 | 552 | 519 | 594 | 791 | 585 | 668 | 34 | 18,729 | + 570 |
| Gateshead | 1,090 | 1,117 | 1,055 | 1,113 | 1,549 | 1,808 | 1,568 | 1,603 | 34 | 42,895 | + 8,243 |
| Gravesend and Northfleet | 221 | 288 | 239 | 236 | 257 | 386 | 259 | 360 | 34 | 8,018 | + 1,035 |
| Greenock-Port Glasgow | 849 | 925 | 957 | 887 | 1,230 | 1,189 | 1,137 | 1,167 | 34 | 29,867 | + 2,797 |
| Jarrow | 144 | 174 | 143 | 164 | 178 | 233 | 171 | 188 | 34 | 5,009 | + 386 |
| Kidderminster | 129 | 348 | 150 | 130 | 149 | 411 | 165 | 156 | 34 | 4,329 | + 210 |
| Merthyr | 219 | 289 | 227 | 210 | 243 | 363 | 259 | 233 | 34 | 7,527 | + 862 |
| Metropolitan Electric | 8,719 | 10,058 | 8,196 | 8,519 | 9,229 | 11,028 | 8,732 | 9,229 | 34 | 305,189 | + 8,045 |
| Middleton | 362 | 395 | 377 | 390 | 436 | 450 | 402 | 464 | 34 | 12,147 | + 791 |
| Oldham-Ashton | 627 | 666 | 638 | 647 | 691 | 710 | 655 | 721 | 34 | 21,090 | + 522 |
| Peterborough | 151 | 198 | 151 | 156 | 235 | 326 | 241 | 261 | 34 | 6,059 | + 1,413 |
| Potteries | 2,035 | 2,288 | 1,692 | 1,912 | 2,141 | 2,346 | 1,809 | 1,982 | 34 | 70,402 | + 7,533 |
| Rothesay | 468 | 597 | 759 | 497 | 696 | 746 | 734 | 742 | 34 | 9,122 | + 902 |
| Sheerness | 66 | 83 | 69 | 68 | 63 | 97 | 76 | 77 | 34 | 1,840 | + 132 |
| South Metropolitan | 862 | 1,073 | 1,117 | 867 | 886 | 1,205 | 1,148 | 936 | 34 | 28,585 | - 297 |
| Southport | 346 | 486 | 405 | 372 | 442 | 551 | 514 | 461 | 34 | 11,085 | + 853 |
| Swansea | 1,244 | 1,844 | 1,273 | 1,260 | 1,354 | 2,021 | 1,383 | 1,371 | 34 | 42,820 | + 4,129 |
| Taunton | 60 | 70 | 51 | 55 | 52 | 70 | 67 | 61 | 34 | 1,646 | + 121 |
| Tynemouth | 351 | 630 | 436 | 439 | 475 | 808 | 512 | 518 | 34 | 9,552 | + 1,001 |
| Weston-super-Mare | 269 | 683 | 432 | 367 | 386 | 953 | 492 | 553 | 34 | 6,284 | + 1,183 |
| Worcester | 362 | 525 | 334 | 358 | 431 | 655 | 462 | 446 | 34 | 10,939 | + 955 |
| Wrexham and District | 117 | 144 | 121 | 122 | 143 | 174 | 151 | 142 | 34 | 4,172 | + 437 |
| Yorks. (Woollen) District | 1,050 | 1,109 | 1,111 | 1,147 | 1,234 | 1,269 | 1,175 | 1,175 | 34 | 39,072 | + 2,822 |

*(Continued on page 236.)*

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# TRAFFIC RETURNS—Tramways and Omnibuses—*continued.*

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | 1913. WEEKS ENDING. | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aug. 3. | Aug. 10. | Aug. 17. | Aug. 24. | Aug. 2. | Aug. 9. | Aug. 16. | Aug. 23. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Burnley Corporation | 1.504 | 1.576 | 1.613 | 1.516 | 2.488 | 2.107 | 1.741 | 1.684 | 34 | 36.182 | + 4.768 |
| Burton-on-Trent Corporation | 334 | 334 | 287 | 299 | 338 | 381 | 336 | 302 | 21 | 6.163 | + 192 |
| Bury Corporation | 1.289 | 1.339 | 1.267 | 1.243 | 1.449 | 1.375 | 1.347 | 1.305 | 21 | 28.836 | + 915 |
| Cardiff Corporation | 2.545 | 2.972 | 2.468 | .. | 2.955 | 3.530 | ... | ... | 19 | 52.289 | + 5.631 |
| Chatham and District | 963 | 1.194 | 954 | 947 | 917 | 1.283 | 1.025 | 1.079 | 33 | 30.427 | + 1.500 |
| Chesterfield Corporation | 319 | 258 | 221 | 221 | 393 | 316 | 251 | 268 | 20 | 5.376 | + 680 |
| Colne and Trawden | 276 | 278 | 289 | 259 | 367 | 333 | 312 | 296 | 34 | 9.304 | + 611 |
| Cork Electric | 518 | 523 | 514 | 497 | 568 | 573 | 548 | 579 | 33 | 16.606 | + 178 |
| Croydon Corporation | 1.774 | 2.180 | 1.657 | ... | 1.657 | 2.113 | 1.615 | ... | 19 | 33.299 | - 4.211 |
| Darlington Corporation | 233 | 238 | 225 | 225 | 258 | 266 | 260 | 240 | 21 | 5.249 | + 495 |
| Derby Corporation | 974 | 1.045 | 912 | 952 | 1.044 | 1.147 | 1.030 | 1.001 | 21 | 20.837 | + 2.221 |
| Dover Corporation | 300 | 370 | 324 | 369 | 303 | 370 | 350 | 403 | 21 | 5.488 | — 124 |
| Dublin and Lucan | 152 | 199 | 178 | 162 | 199 | 242 | 186 | 213 | 7⅞ | 1.486 | + 200 |
| Dublin United | 5.647 | 6.364 | 6.001 | 5.726 | 6.879 | 7.540 | 6.482 | 6.655 | 33 | 202.526 | + 6.725 |
| Dundee City | 1.135 | 1.137 | 1.201 | 1.211 | 1.442 | 1.301 | 1.266 | 1.330 | 14 | 18.601 | + 1.592 |
| East Ham Corporation | 1.054 | 1.127 | 1.057 | 1.135 | 915 | 1.061 | 934 | 979 | 21 | 21.513 | - 855 |
| Exeter Corporation | 358 | 444 | 352 | 354 | 397 | 489 | 399 | 405 | 21 | 7.457 | + 287 |
| Gearless Motor Buses | ... | ... | ... | ... | ... | 610 | 632 | 576 | 19 | 8.464 | — |
| Glasgow Corporation | 17.887 | 17.579 | 18.196 | 18.153 | 18.449 | 19.302 | 19.753 | 19.653 | 12 | 236.021 | + 17.200 |
| Glossop (Urban Elec. Supply Co.) | 126 | 137 | 134 | 112 | 140 | 140 | 141 | 127 | 34 | 4.377 | + 504 |
| Halifax Corporation | 2.087 | 2.092 | 2.397 | 2.128 | 2.307 | 2.521 | 2.461 | 2.366 | 20 | 44.370 | + 415 |
| Hastings and District | 1.177 | 1.645 | 1.544 | 1.628 | 1.334 | 2.050 | 1.775 | 1.905 | 34 | 34.559 | + 2.301 |
| Huddersfield Corporation | 1.983 | 2.074 | 2.064 | 2.023 | 2.275 | 2.408 | 2.197 | 2.145 | 21 | 45.226 | + 2.841 |
| Hull Corporation | 3.021 | 3.063 | 2.945 | 2.957 | 3.123 | 3.216 | 2.994 | 3.046 | 21 | 63.945 | + 3.190 |
| Ilford U.D. Council | 516 | 643 | 456 | 463 | 442 | 548 | 430 | 453 | 21 | 9.682 | - 1.599 |
| Ilkeston Corporation | 137 | 117 | 130 | 126 | 165 | 132 | 139 | 145 | 22 | 2.901 | + 541 |
| Ipswich Corporation | 522 | 636 | 531 | 526 | 548 | 684 | 571 | 583 | 19 | 10.106 | + 137 |
| Isle of Thanet | 1.424 | 2.032 | 2.052 | 1.809 | 1.540 | 2.337 | 2.112 | 2.141 | 47 | 29.484 | + 1.279 |
| Kilmarnock Corporation | 164 | 170 | 155 | 161 | 267 | 172 | 162 | 171 | 14 | 2.641 | + 179 |
| Lanarkshire | 1.409 | 1.431 | 1.612 | 1.584 | 1.545 | 1.650 | 1.698 | 1.795 | 33 | 55.162 | + 7.035 |
| Lancashire United | 1.387 | 1.590 | 1.474 | 1.442 | 1.705 | 1.931 | 1.628 | 1.716 | 33 | 50.222 | + 5.307 |
| Leeds City | 7.814 | 7.978 | 7.603 | 7.806 | 8.565 | 9.161 | 7.899 | 8.386 | 21 | 174.960 | + 11.351 |
| Leicester Corporation | 2.659 | 2.858 | 2.382 | 2.563 | 2.911 | 3.043 | 2.670 | 2.790 | 34 | 94.298 | + 8.698 |
| Leith Corporation | 688 | 672 | 750 | 668 | 717 | 752 | 725 | 729 | 14 | 10.730 | + 272 |
| Liverpool Corporation | 12.395 | 13.089 | 12.177 | 11.858 | 13.657 | 14.348 | 13.462 | 13.271 | 33½ | 433.718 | + 31.975 |
| Llandudno and Colwyn Bay | 609 | 1.086 | 917 | 835 | 683 | 1.097 | 987 | 891 | 38 | 12.782 | + 1.113 |
| London County Council | 41.585 | 42.115 | 38.798 | 39.502 | 41.410 | 43.285 | 38.450 | 40.360 | 20 | 854.231 | - 21.194 |
| London General Omnibus | 54.124 | 54.090 | 52.375 | 50.842 | 68.575 | 70.246 | 61.896 | 62.262 | 34 | 2.112.041 | +448.044 |
| London United | 6.589 | 8.219 | 6.206 | 6.343 | 7.000 | 9.382 | 6.875 | 7.329 | 34 | 213.565 | + 854 |
| Lowestoft Corporation | 435 | 577 | 498 | 494 | 383 | 542 | 505 | 549 | 46 | 9.488 | + 282 |
| Maidstone Corporation | 204 | 270 | 205 | 211 | 226 | 286 | 212 | 228 | 21 | 4.375 | + 222 |
| Manchester Corporation | 16.328 | 17.081 | 16.269 | 16.452 | 17.546 | 17.969 | 16.975 | 17.200 | 21 | 369.550 | + 17.982 |
| Nelson Corporation | 217 | 196 | 211 | 201 | 261 | 234 | 227 | 227 | 21 | 4.520 | + 273 |
| Newcastle-on-Tyne Corporation | 4.367 | 4.309 | 4.102 | 4.246 | 4.890 | 4.994 | 4.583 | 4.578 | 21 | 100.567 | + 8.446 |
| Newport (Mon.) Corporation | 738 | 852 | 690 | 730 | 831 | 940 | 783 | 790 | 21 | 15.959 | + 1.059 |
| New St. Helens and District | 793 | 1.128 | 840 | 730 | 936 | 1.391 | 904 | 892 | 8 | 7.273 | + 981 |
| Northampton Corporation | 583 | 660 | 500 | 561 | 603 | 745 | 577 | 616 | 20½ | 12.212 | + 446 |
| Nottingham Corporation | 3.170 | 3.501 | 2.960 | 3.089 | 3.334 | 3.663 | 3.209 | 3.245 | 20½ | 68.574 | + 2.315 |
| Oldham Corporation | 2.123 | 2.121 | 2.065 | 2.107 | 2.396 | 2.234 | 2.242 | 2.262 | 22 | 48.543 | + 2.774 |
| Portsmouth Corporation | 2.505 | 3.100 | 2.566 | 2.585 | 2.804 | 3.724 | 3.195 | 3.227 | 21 | 50.756 | + 1.750 |
| Preston Corporation | 873 | 1.267 | 898 | 816 | 881 | 857 | 936 | 861 | 21 | 18.727 | + 927 |
| Provincial | 2.270 | 3.191 | 2.342 | 2.390 | 2.532 | 3.877 | 2.894 | 2.947 | 47 | 88.395 | + 5.704 |
| Reading Corporation | 678 | 795 | 656 | 658 | 727 | 905 | 718 | 743 | 20 | 14.390 | + 831 |
| Rochdale Corporation | 1.589 | 1.594 | 1.474 | 1.503 | 1.788 | 1.717 | 1.639 | 1.665 | 21 | 34.173 | + 1.044 |
| Rotherham Corporation | 827 | 775 | 775 | 754 | 1.214 | 1.011 | 1.024 | 1.074 | 21 | 20.059 | + 5.282 |
| Salford Corporation | 5.061 | 4.904 | 4.773 | 4.818 | 5.657 | 4.950 | 5.104 | 5.041 | 21 | 110.793 | + 3.607 |
| Sheffield Corporation | 6.605 | 6.847 | 6.483 | 6.683 | 7.158 | 7.171 | 6.884 | 7.223 | 21½ | 158.997 | + 14.723 |
| Southampton Corporation | 1.358 | 1.593 | 1.339 | 1.344 | 1.458 | 1.838 | 1.468 | 1.538 | 20 | 27.611 | + 1.069 |
| Southend-on-Sea Corporation | 1.068 | 1.570 | 1.360 | 1.325 | 1.251 | 1.983 | 1.697 | 1.752 | 21 | 21.374 | + 2.803 |
| South Shields Corporation | 684 | 758 | 717 | 687 | 858 | 945 | 841 | 816 | 21 | 15.532 | + 2.085 |
| Sunderland Corporation | 1.411 | 1.822 | 1.452 | 1.312 | 1.845 | 2.047 | 1.552 | 1.557 | 21 | 31.232 | + 3.432 |
| Swindon Corporation | 162 | 212 | 184 | 164 | 164 | 226 | 209 | 189 | 20 | 3.421 | + 255 |
| Tramways (M.E.T.) Omnibus Co. | ... | ... | ... | ... | 8.008 | 8.915 | 7.893 | 8.364 | 29 | 118.396 | — |
| Tyneside Tramways and Tramroads | 531 | 552 | 516 | 556 | 579 | 768 | 556 | 578 | 8 | 4.228 | + 317 |
| Wallasey Corporation | 1.234 | 1.530 | 1.251 | 1.178 | 1.453 | 1.794 | 1.481 | 1.411 | 20½ | 26.974 | + 2.356 |
| Walsall Corporation | 601 | 739 | 541 | 630 | 639 | 765 | 598 | 682 | 34 | 20.946 | + 1.413 |
| Walthamstow U.D. Council | 713 | 848 | 684 | 693 | 790 | 999 | 759 | 816 | 21 | 16.094 | - 452 |
| Warrington Corporation | 436 | 450 | 415 | 433 | 430 | 461 | 438 | 423 | 21 | 9.220 | + 337 |
| West Ham Corporation | 2.570 | 2.841 | 2.473 | 2.638 | 2.668 | 3.019 | 2.560 | 2.662 | 20½ | 56.559 | + 1.383 |
| Wigan Corporation | 1.323 | 1.474 | 1.364 | 1.298 | 1.452 | 1.644 | 1.509 | 1.416 | 20½ | 30.315 | + 3.232 |
| Wolverhampton Corporation | 1.252 | 981 | 1.084 | 1.020 | 1.379 | 1.011 | 1.130 | 1.085 | 22 | 23.596 | + 1.286 |
| Yorkshire (West Riding) | 1.562 | 1.551 | 1.283 | 1.363 | 1.559 | 2.070 | 1.391 | 1.692 | 34 | 49.175 | + 5.500 |
| **FOREIGN TRAMWAYS.** | | | | | | | | | | | |
| Anglo-Argentine | 50.055 | 48.410 | 47.164 | 48.263 | 55.298 | 54.126 | 53.957 | 50.368 | 34 | 1.884.512 | +165.451 |
| Auckland (28 days) | 18.353 | ... | ... | ... | 18.960 | ... | ... | ... | 4½ | 22.067 | + 209 |
| Bombay | 2.765 | ... | ... | ... | 3.033 | ... | ... | ... | 31 | 96.134 | + 4.218 |
| Brazilian Street (month) Mlrs. | 41.756 | ... | ... | ... | 49.056 | ... | ... | ... | 52 | 545.185 | + 24.923 |
| Brazilian Traction | 79.372 | 85.599 | 86.984 | 84.956 | 95.445 | 97.049 | 94.306 | 94.134 | 34 | 3.012.344 | +437.488 |
| Brisbane (month) | 23.060 | ... | ... | ... | 26.205 | ... | ... | ... | 30 | 177.208 | + 46.494 |
| British Columbia (month) $ | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Buenos Aires Port and City (month) | 6.124 | ... | ... | ... | 6.513 | ... | ... | ... | 30 | 46.073 | + 1.750 |
| Buenos Ayres Lacroze (month) | 42.052 | ... | ... | ... | 45.324 | ... | ... | ... | 4 | 45.324 | + 3.272 |
| Calcutta Rs. | 60.192 | 62.042 | 60.990 | 59.200 | 63.944 | 65.534 | 66.096 | 63.772 | 34 | 21.59.704 | +104.853 |
| Cape Town (month) | 10.875 | ... | ... | ... | 11.417 | ... | ... | ... | 30 | 86.900 | + 5.182 |
| Carthagena and Herrerias (month) | 3.350 | ... | ... | ... | 3.794 | ... | ... | ... | 30 | 21.125 | + 6.942 |
| East India (Simplex petrol) (month) | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Kalgoorlie (month) | 2.993 | .. | ... | ... | 2.796 | ... | ... | ... | 30 | 20.022 | - 1.628 |
| La Plata (month) | 3.593 | ... | ... | ... | 4.770 | ... | ... | ... | 30 | 36.342 | + 7.999 |
| Lima (month) | 32.259 | ... | ... | ... | 34.410 | ... | ... | ... | 30 | 232.637 | + 10.261 |
| Madras Rs. | ... | (2 weeks) | 24.838 | ... | ... | (2 weeks) | 27.034 | ... | 32 | 4.02.121 | + 30.254 |
| Melbourne (month) | ... | ... | ... | ... | 59.000 | ... | ... | ... | — | — | — |
| Mexico (month) $ | 570.619 | ... | ... | ... | 610.602 | ... | ... | ... | 30 | 3.876.142 | + 34.102 |
| Montevideo (month) | 25.435 | .. | ... | ... | 29.189 | ... | ... | ... | 39 | 287.602 | + 23.745 |
| Para | 3.947 | 4.069 | 3.969 | 4.209 | 3.831 | 3.940 | 3.662 | 3.607 | 38 | 153.421 | + 1.752 |
| Port Elizabeth (month) | 3.126 | ... | ... | ... | 3.256 | ... | ... | ... | 30 | 25.127 | + 6.662 |
| Shanghai $ | 20.570 | 20.853 | 21.030 | 19.486 | 31.200 | 26.200 | 24.400 | 24.200 | 33 | 711.252 | + 73.706 |
| Singapore $ | 10.208 | 10.676 | 10.108 | 9.535 | 12.044 | 12.232 | 12.790 | 12.932 | 34 | 401.281 | + 48.842 |
| Toronto (month) $ | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Winnipeg (month) $ | ... | ... | ... | ... | ... | ... | ... | ... | — | — | -- |
| **ELECTRIC RAILWAYS.** | | | | | | | | | | | |
| Central London | 4.503 | 4.419 | 4.066 | 4.306 | 4.142 | 3.647 | 3.694 | 3.657 | 34 | 166.492 | + 11.600 |
| City and South London | 2.931 | 2.847 | 2.738 | 2.975 | 2.649 | 2.601 | 2.548 | 2.431 | 34 | 95.499 | - 9.000 |
| Liverpool Overhead | 1.659 | 1.881 | 1.754 | 1.693 | 1.840 | 2.101 | 1.915 | 1.869 | 34 | 58.385 | + 4.664 |
| London Electric | 12.020 | 11.765 | 11.085 | 11.500 | 11.760 | 11.840 | 10.995 | 10.795 | 34 | 467.379 | + 4.790 |
| Mersey | 2.089 | 2.458 | 2.071 | 1.928 | 2.155 | 2.239 | 2.156 | 2.015 | 34 | 75.711 | + 4.953 |
| Metropolitan | 16.592 | 16.509 | 15.131 | 15.922 | 16.624 | 16.367 | 15.238 | 15.526 | 34 | 568.486 | + 3.048 |
| Metropolitan District | 12.042 | 11.733 | 10.994 | 10.981 | 12.448 | 12.737 | 11.407 | 11.225 | 34 | 442.556 | + 18.168 |

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# E.C.C.

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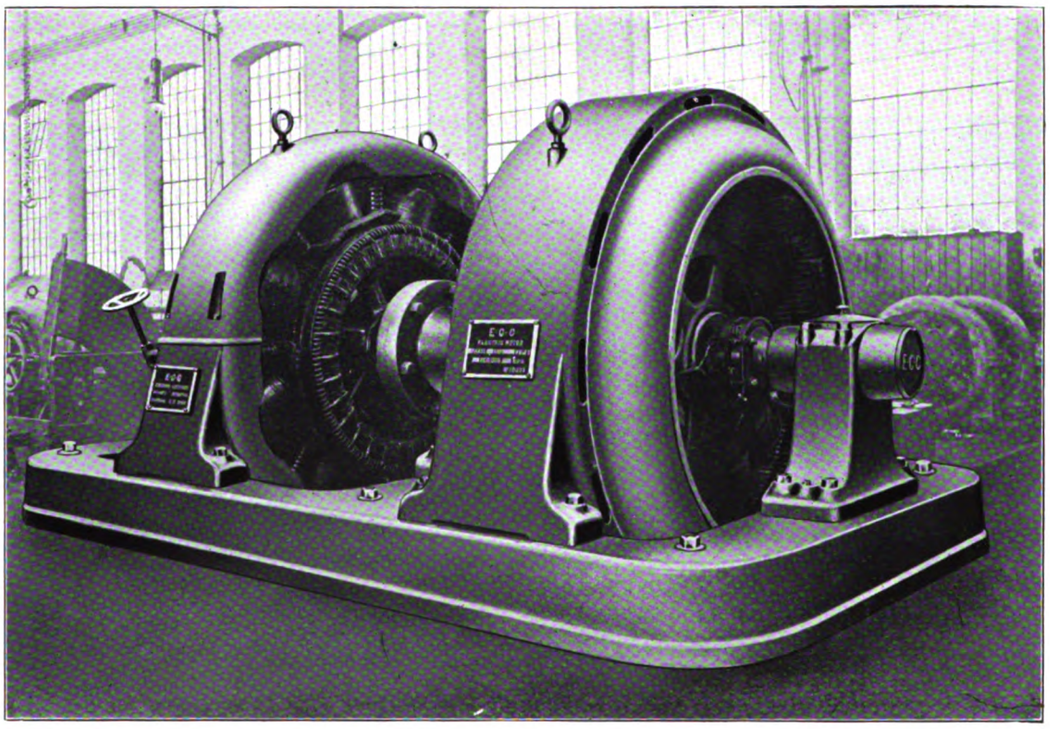

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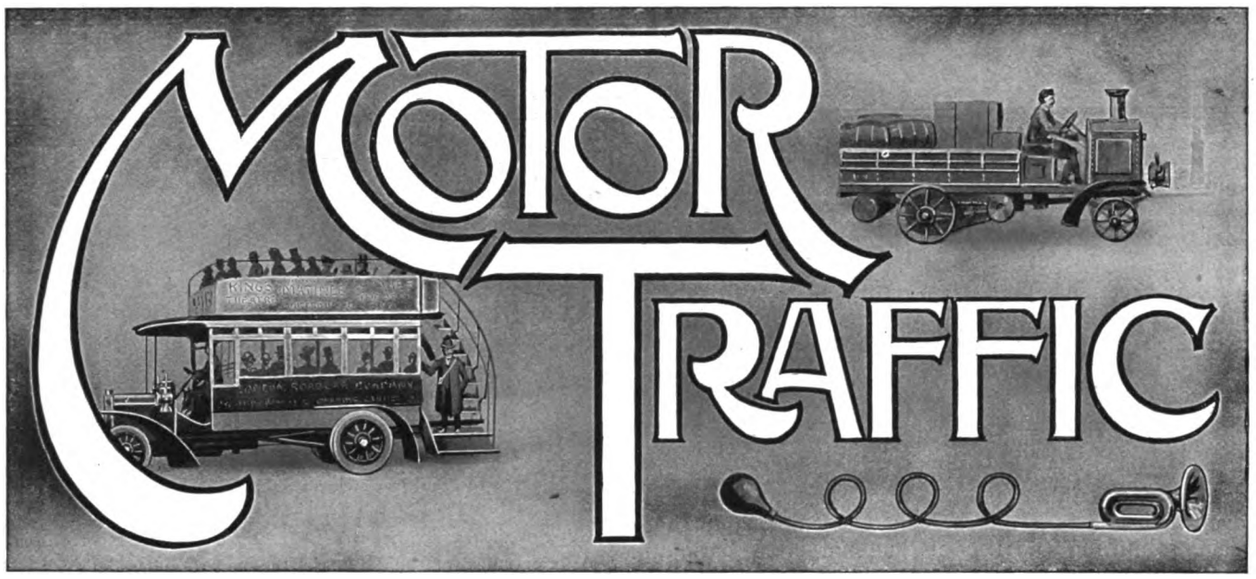


If our system of Parliamentary Government is not to become a mockery, the Cabinet should at once take steps to show that the report of the Select Committee on power-driven traffic in the metropolis is to be brought under immediate consideration with a view either to the carrying out of such of their recommendations as may be deemed advisable or a combination of the same in conjunction with the report of the Royal Commission. Thanks to the policy of drift, which has been followed since the latter body reported in 1905, after investigations which cost the taxpayers a sum of £26,672, the matter has become so urgent that it would be criminal to allow another lengthy period of inactivity to intervene. The departments chiefly concerned are the Home Office, the Board of Trade, and the Local Government Board, the greatest degree of responsibility resting upon the minister who has to sustain the worry of the militant suffrage agitation, the police and prison system of the country, and a multitude of other affairs. This in itself affords sufficient ground for separating London traffic from the medley of duties appertaining to the headship of the Home Office. The same contention holds good as regards his chief executive officer, the Commissioner of Police, even though, as far as circumstances permit, the latter has built up an efficient public carriage licensing department that, with the assistance of a technical adviser, has gained credit for eliminating from the petrol-driven vehicle the objections which four years ago prevented it from becoming the indispensable factor in metropolitan traffic which it is to-day. The good-will of the motor omnibus companies, and of manufacturers eager to secure the best results from their vehicles, has been no small contributory cause towards enabling the police to impose regulations regarding construction which were not justified by their powers.

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In return for the work which the public carriage department at Scotland Yard have accomplished there can be no objection to transferring the nucleus thereof direct to the proposed new Traffic Branch of the Board of Trade, or, better still, the Traffic Board suggested by the Royal Commission. This branch of police work must of necessity come within the scope of the new authority, whose jurisdiction presumably will extend over the 700 square miles of the Metropolitan Police area, and the square mile of the city. The hugeness of the district to be dealt with, combined with the facts that about 140 local authorities are concerned in its rule, and that apart from tramways nobody has power to prevent cut-throat competition in passenger transport, such as until recently was the fate with motor cab enterprise, all go to demand exceptional treatment for London's traffic problem. With six county and county borough councils and thirty borough and urban councils all concerned in the government of the metropolitan area, the people of London lack the community of interest that distinguishes the provincial city. Indeed, there is open antagonism between county councils and borough councils on other matters besides that of transit, and it would result only in delay and perhaps hopeless muddle to entrust the licensing, routes, time tables, and numbers of stage carriages to the county and county borough councils. As is proposed, after an unfortunate transit promoter has run the gauntlet of the six authorities, he is to be consoled with the prospect of further delay and expense in appealing to the new Traffic Branch of the Board of Trade. The common sense of the Cabinet ought to enable them to avoid the pitfall which is entailed by this recommendation of the Select Committee. If the Government have any misgivings as to the need of London being for an entirely independent traffic body let them seek the advice of three or four experts representing the various interests. No question as to the readjustment of public vehicle taxation should be allowed to delay the setting up of the new authority.

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An overhauling of the Acts and regulations which govern light and heavy motor vehicles is long overdue. Year by year the Motor Car Act, 1903, is placed at the end of each session in the list of expiring measures which are formally renewed, but this state of things would have ended before now but for the Road Board having been brought into existence to administer the funds accruing from the increased taxation of motorists and the placing of a duty on petrol three years ago. The private motorists' organisations are agreed upon the changes which they desire to see effected, the chief alterations being the raising of the present speed limit of 20 miles on roads removed from populated centres, and the abolition of various oppressive features. So far there has been no expression of the views of owners of motor vehicles engaged in public passenger and industrial work. While for these heavy vehicles there can be no objection to the continuance of the speeds of five, eight, and twelve miles an hour imposed by Orders made by the Local Government Board under the Motor Car Act, there are other directions in which need exists for guarding the interests of these

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users. An appropriate body to lead the movement would be the Society of Motor Manufacturers and Traders, who are free from any spirit of the rivalry which may prevail between the London users' organisation and the provincial associations that have come into existence during the last year or so. The best evidence of the need for the society to bestir themselves is shown by the decision of the Associations of Municipal Corporations, County Councils, etc., to approach the Government in order to urge amendments in the various Acts and Orders. The decisions arrived at by one of these bodies may be regarded as typical of the desires of the remainder. Under the Highways and Locomotives (Amendment) Act, 1878, the Local Government Board are to be asked to make a further order prohibiting the use of diagonal cross bars on wheels mentioned in the Act of 1878, and allowing wooden blocks to be used without springs; to repeal the whole of section 28 of the Act of 1878 which deals with the weight of locomotives and the construction of wheels; and to provide that the Board may from time to time deal with the matter by means of regulations.

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It is asked that the Locomotives on Highways Act, 1896, and the Highways and Locomotives (Amendment) Act, 1878, may be amended so as to invest local authorities with powers to prohibit for a reasonable time heavy locomotive traffic on roads recently made up. By article 2 of the Heavy Motor Car Order, 1904, the expression "weight," in relation to heavy motor cars or trailers when unladen, is defined to mean the weight of the vehicle exclusive of the weight of any water, fuel, or accumulators used for the purpose of propulsion. The provision of a clearer definition of the expression "weight" is considered desirable, as it has been found in practice that parts of motor cars are frequently removed when such vehicles are submitted to the local authority for inspection and registration, the contention being that they are not essential parts of the vehicle. A regulation is to be sought that cars shall be made to conform with any new regulations that may from time to time be made, or be prohibited the use of the road, the period of six months' grace to be extended. It is also urged that each heavy motor should be weighed annually by some registration authority and a certificate given. For cars with tyres constructed of a hard or non-elastic material, it is proposed to reduce the speed limit of eight miles an hour to four miles, as is the case with traction engines. The association referred to is of opinion that much damage at present caused to highways would be avoided in that case. The substitution of two miles for half a mile is recommended in the regulation giving power to the officer of the registering authority to require a heavy motor car upon a highway to be driven upon any public weighing machine within half a mile of the highway for the purpose of testing its axle weight. A new regulation is proposed prescribing the fixing of flexible side mud or splash guards reaching to the ground on the outer sides of the wheels. Of the proposed alterations in the Motor Car Act, 1903, the one of most interest to manufacturers is the recommendation that separate identification marks shall be obtained from the Council of every county or county borough in whose area manufacturers or dealers have separate premises from which cars bearing manufacturers' marks are used.

## HEAVY MOTOR VEHICLES.

*By Geo. W. Watson, M.I.Mech.E., and D. S. Kennedy.

British manufacturers have led from the first in the matter of the construction and use of self-propelled vehicles for business purposes. It is within the power of the members of this Institution to maintain the position which established manufacturers have secured, and by careful and systematic attention to details, to reduce design to the simplest possible limit, and manufacturing costs to a figure which will preclude all possibility of the long-talked-of American invasion of industrial motors. It is the authors' intention in the course of the present paper to deal only with goods-carrying vehicles having a load capacity of three tons and upwards.

### Cylinder Capacity of Petrol Vehicles in Relation to Load.

A brief study of the tables in the paper giving data for eight different makes of petrol chassis will show that there is nothing like unanimity among manufacturers as to the correct size of engines in relation to load carried. The difference in the weights of the chassis is not sufficient to account for so wide a variation in engine dimensions. Either the smaller of the two engines is too small for regular service, or the bigger is too large. If the smaller one can effectively deal with the load, then the larger engine is obviously inefficient. Its power is being swallowed up by an ill-designed transmission gear, or the builder has fitted it because it was his nearest standard size for a chassis of that particular load capacity. In any case, the unfortunate user suffers, as his fuel and oil bills will undoubtedly be greatly in excess of those for an engine whose dimensions are better related to the gross load of the vehicle. It may be argued that the provision of a big engine reduces the risk of delays which might otherwise arise through lack of power, but it hardly seems logical to carry about an engine which is never called upon to exert its full power for more than one per cent. of its running time. It is the authors' experience that for a three-tonner, a four-cylinder engine with cylinders 4¼ in. in diameter, and 5 in. stroke, is capable of giving all the power that is needed, and with such an engine and a total gear ratio on top speed of eight to one, most of the running may be made through the direct drive, which is obviously the most efficient means of transmission. For loads of 4·5 tons the engine might with advantage have its cylinders increased to 4¾ in. in diameter and 5½ in. stroke, as, although the 4¼ in. by 5 in. engine will usually be found sufficient for all ordinary needs, the increased power, due to the larger dimensions, will ensure a higher point-to-point speed, and that is one of the chief factors to be considered in modern transport work.

In advocating engines of the two sizes named for the respective sizes of chassis under discussion, the authors have assumed that their normal speed is 1,000 revs. per minute when travelling on top gear at the maximum speed allowed by the Heavy Motor Car Order, with a compression pressure of between 70 and 75 lb. per square inch, which pressure they have found to give very satisfactory running and that degree of "controllability" which is highly desirable for the engines of commercial vehicles. A higher compression pressure would certainly increase the thermal efficiency, but, on the other hand, it would entail increased pressures on big-ends and main bearings, and greater stresses in all the transmission parts, and it is most desirable, in order to keep down the bill for running repairs to a minimum, that the maximum stresses due to the explosive effort, be kept as low as possible.

### General Design of Engines.

The general construction of an engine for commercial vehicle use should be such as to give the maximum degree of accessibility for all the wearing parts. In this respect it is interesting to note that, though the War Department have been criticised for their specification for subvention vehicles, that specification has caused manufacturers to pay more attention to the question of accessibility. One of the best examples of design, having regard to the accessibility of all its parts, with resulting general convenience, is that of the latest Maudslay engine, but the authors are not in entire agreement with the placing of the valves directly over the pistons in an engine for commercial use, as, apart from the likelihood of extensive damage to the pistons and other parts in the event of a broken valve falling into the cylinder, this construction involves the employment of a universally-jointed shaft and at least two pairs of skew gears for driving the cam shaft, and in the authors' experience a drive of this type quickly develops backlash and becomes noisy.

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Extracts from a paper read before the Institution of Automobile Engineers.

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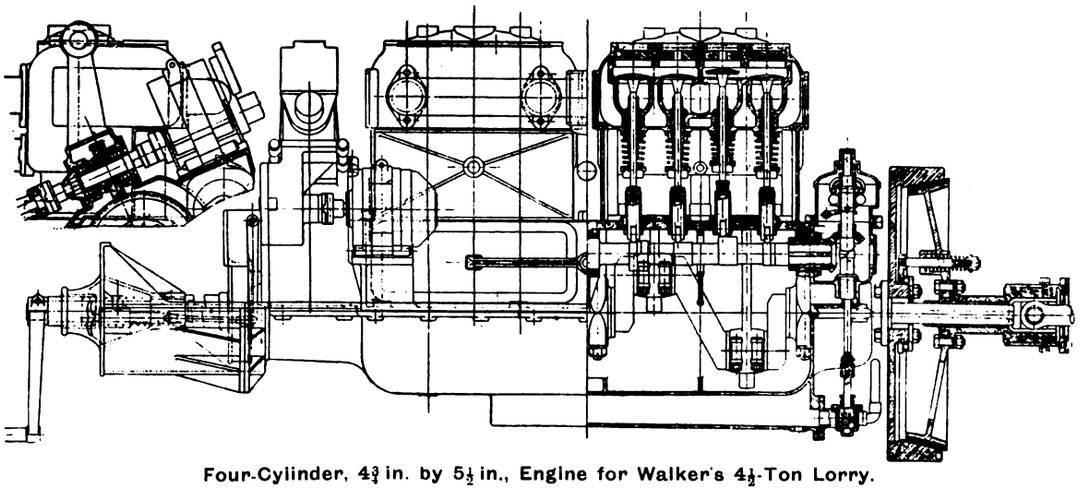
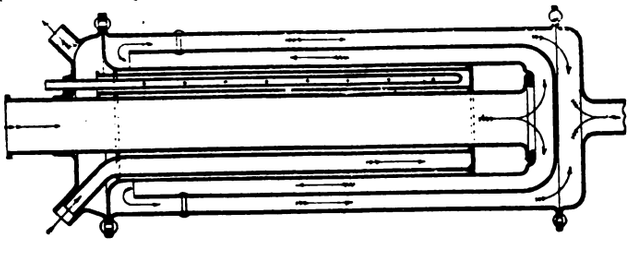
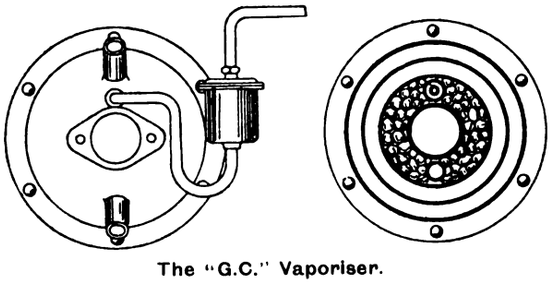
Another engine, of which a drawing is given, is that now being built by Walker Brothers, Limited, for a subvention type chassis. Everything that needs to be taken into account for a commercial vehicle engine appears to have been considered, even to the matter of making permanent provision for the mounting and driving of an electric lighting dynamo, or, in its place, when desired, a reserve magneto for ignition purposes; notwithstanding this provision, access to the doors and the covers for the valve tappets and crank case has not been interfered with in the slightest degree. In this engine, a tray which forms an extension from the lower part of the crank case is carried forward so as to fill in the space between the front portion of the crank case proper and the cross member below the radiator, thus dispensing entirely with the need for an undershield below the engine, which always interferes with access to the big-ends. This tray carries the starting handle and the connection to the sliding cam shaft which provides for compression release. The authors are of opinion that for an engine of the dimensions given, namely 4¾ in. by 5½ in., it is essential that compression release cams be provided. This engine is also provided with a governor in conformity with the War Department's specification. The authors also dealt with lubrication and cooling.



Four-Cylinder, 4¾ in. by 5½ in., Engine for Walker's 4½-Ton Lorry.





The "G.C." Vaporiser.

### The Fuel Question.

The present time, when petrol prices are soaring higher each week, is a not inappropriate one for makers and users to consider whether they are altogether at the mercy of the petrol combine. Recent investigations would indicate that they are not. The use of benzol will undoubtedly be a feature of future development; enormous quantities of coal are daily being converted into coke. Only a small fraction of this coke is being produced in by-product ovens, yet the by-products are more valuable than the coke itselt. The chief by-product is coal tar, and the modern chemist has found in this evil-smelling and foul mixture a mine of most wonderful materials. 100 lb. of dry coal, if coked in a by-product oven, will yield about 68 lb. of coke, 15 lb. of gases, 10 lb. of ammonia water, and 7 lb. of tar. Members of this Institution are most interested in the tar, which contains something like 40 per cent. of light oils, and of these again some 65 per cent. are of the benzol class.

The adulteration of petroleum spirit has gone along slowly, but surely, and the grade has gradually become heavier, until what is to-day sold as petrol contains nearly one-half of the heavier fuels, such as paraffin, yet there appears to be no difficulty in the way of producing carburettors capable of dealing with this heavier fuel. So far have engineers gone in this respect that it is not too much to expect that in the near future they will go the whole way and use paraffin only, but it must not be thought that this change can be made without alteration in the carburettor, for such is not the case, and in fact many devices now on the market will not handle this fuel at all. The G.C. vaporiser is one of the few devices which have been given practical trial. This arrangement must not be confused with the ordinary type of petrol or paraffin carburettor, inasmuch as there is no attempt to atomise the fuel by passing air over it as it comes out of the jet. The whole purpose of the vaporiser is to gasify the fuel slowly, and not in any way to attempt mechanical atomisation. Owing to the large size of the vaporiser, it will readily be understood that there is always a large volume of fuel undergoing vaporisation, so that the action of the vaporiser is not sensitive to sudden temporary changes in the demands of the engine. As regards weight and space occupied, the apparatus takes up very little more room than an ordinary type of silencer, and as it incidentally performs the functions of a silencer, it may be said that the machinery space is no greater. It is, of course, heavier than a silencer, but that is of no consequence under ordinary conditions.

### Thomas Petrol-Electric Transmission.

After describing clutches and change-speed gear boxes, the authors said: Other means of obtaining torque-speed variation have been employed, with more or less success, some of them hydraulically, some electrically, and some by a combination of electrical and mechanical contrivances. Dr. Hele-Shaw has produced a hydraulic system which will undoubtedly find extensive employment in the future, but the authors prefer to leave Dr. Hele-Shaw to deal with his system in a paper which they believe is now under consideration.

There have been many electric and petrol-electric systems advanced from time to time, but, unfortunately, most systems, while meeting, to a great extent, the requirements of flexibility, fall very low in the efficiency scale. This is due chiefly to the fact that in most systems the entire load at times is transmitted electrically. In one or two systems a direct drive on "top" is provided, and when running on top a maximum of efficiency is obtained, but in all controller positions below top gear the whole load is transmitted electrically, and the total efficiency of the dynamotor and final-drive mechanism has been known to fall below 50 per cent.; such a low rate of efficiency is quite inadmissible for commercial vehicles.

Attention is drawn to the Thomas system, in which these conditions do not prevail, because at all times part of the power of the engine is



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transmitted mechanically to the road wheels, the remaining portion of the power being transmitted electrically for acceleration purposes. The latest development of this petrol-electric system consists of a petrol engine, a simple epicyclic gear, and two electrical machines, both of which machines may be run as dynamos or motors. There are also two clutches. Of the two sun pinions in the epicyclic gear the smaller is coupled direct to the armature of the first electrical machine, whilst the larger of the two sun pinions is coupled to a second electrical machine, which is permanently coupled to the driving axle. A 12-volt battery is carried on the vehicle, and when current from this is circulated through the windings of the first electrical machine it acts as a motor for the purpose of starting up the engine, the rear clutch, meanwhile, being disengaged. If, now, the forward clutch be disengaged and the rear clutch engaged, the planetary cage will be rotated at the same speed as the crank shaft, and as the planetary pinions mesh with the two sun pinions it follows that there must be a relative motion between the various pinions. The armature of the second electrical machine and the larger of the sun pinions, on account of the load on the road wheels, will remain stationary at first, and consequently the smaller of the sun pinions and the first electrical machine will be caused to rotate in a direction opposite to that of the engine, the first electrical machine then acting as a dynamo, and supplying current to the second electrical machine, and driving it as a motor.

In this way the epicyclic gear, having a differential effect, drives the armature of the second electrical machine and the cardan shaft partly mechanically and partly electrically. As the controller lever is advanced step by step, the strength of the field of the first dynamotor is varied, and its speed of anti-clockwise rotation gradually reduced until it comes to rest, momentarily, and then commences to rotate in the same direction as the engine; gradually the difference in speeds between the two armatures is reduced until they are both rotating at exactly the same speed, when the forward clutch is engaged, and the engine is then in direct mechanical connection with the final drive gear, all the electrical machinery being inoperative. Types of final drive, worm-driven axles, double-reduction gear axles, torque bars and radius rods, radius rods for chain drive, torque and thrust taper by springs, and enclosed cardan shafts, were next dealt with.

### Brakes, Front Axles, and Front-Driven Vehicles.

Front brakes, in the author's opinion, are a source of danger. If one or both back wheels are locked, the car will not necessarily skid or lose steerage way, but if the front wheels are locked all ability to steer is gone instantly, and the car will continue forward in the line of motion it was pursuing at the moment the wheels became locked. On a curve, for instance, if the front brakes are applied so that they lock the wheels, the car would go straight across to the other side of the road at a tangent to the curve it was formerly pursuing. Very careful compensation and extremely accurate adjustment have to be made, even in the case of well designed front-wheel brakes, to provide the maximum of braking effort short of locking the wheels. When these conditions are present the front-wheel brake is a success, but it is an interesting fact that makers who have tried front brakes have rarely fitted them a second time Many accidents with motor fire engines have been attributable to front-wheel skids as the result of fierce application of front wheel brakes, and the authors believe that all the fire engines owned by the London County Council Brigade which were fitted with front brakes have had them removed. Experiments are now being carried out by a number of makers and users in the matter of braking on one front wheel and one back wheel, the wheels being at opposite ends of the respective axles. This system of braking is known as diagonal braking, and it is probable that the experiments may bring to light many new factors relating to the design and construction of brakes for road vehicles.

The steering gear in most general use is that in which a worm and sector are employed, although a few makers have a screw and nut instead of the worm and sector. The latter type undoubtedly offers greater wearing surface, and should prove more generally satisfactory. Whichever type may be employed, it is necessary that provision be made for adjustment for wear, and that suitable thrust bearings be fitted, otherwise backlash will develop at an alarming rate, The steering connections also should be provided with means of adjustment. Many existing machines leave much to be desired in this respect. The steering arms should always be fitted with tapered spigot and socket, and not left parallel as is so often the case.

From time to time designs of commercial vehicles have been produced in which the drive is transmitted through the front wheels, the same wheels being also used to steer the vehicle: but, in this country, practically no headway has been made in the construction and use of this type of vehicle. French engineers have, however, given more serious consideration to it, and some interesting systems have been evolved. Views were given of the Renard-Latil Train (as illustrated in the issue of this journal dated March 13) and the Mass Tractor Fore Carriage; the former employs a gear drive throughout, with short cardan shafts; whilst the construction of the latter is much simpler, and the drive from the ends of the differential shaft in the change-speed gear box to the front wheels is taken through the medium of two side chains.

The authors have had no personal experience of either the construction or running of front drivers, although both of them have witnessed running tests with machines of this class, and they have been impressed by the ease with which front drivers can "get away" out of difficult positions on greasy pavements, and the almost total absence of skidding and side-slips. It is doubtful, however, whether the front-drive principle will ever be adopted, except for special applications where a very low platform is required, such as for furniture vans and vans for veterinary use, and for the conveyance of safes and other heavy goods. Almost any class of frame can be secured to the frame of the fore carriage, wood being preferable to all other materials on account of its ability to resist road shocks without fatigue. Existing vehicles, such as furniture vans, providing the back axle be perfectly sound, may readily be altered for attachment to such a fore carriage.

### General Arrangement.

Whatever special features there may be in the design of a heavy petrol vehicle, the general arrangement should be one that will permit the removal of any unit without disturbing any other parts, and for this reason the combined-unit form of construction, such as is now employed in many lighter vehicles, is not permissible. Every working part should be enclosed and protected from dust and grit, and between clutch and gear box, and between gear box and countershaft (if one is fitted, or between gear box and back axle), there should be suitable universally-jointed shafts which will eliminate all possibility of the imposition on the driving shafts of undue stresses which tend to throw the shaft out of alingment. A mistake is made in trying to secure a rigid chassis construction, whereas the design should be so arranged that the chassis may "work." Everything must be so mounted that distortion, due to uneven road surfaces and bad loading, will not subject any part to undue strain.

### Tyres.

After dealing at length with steam vehicles the paper proceeded: The solid-rubber tyre has been a very powerful factor in the evolution of commercial vehicles, and at the present time the use of such tyres has become an economic necessity; yet it was not always so. In the earlier days of the development so small a vehicle as a 30-cwt. petrol van cost, for rubber tyres, 8d. per set per vehicle-mile for country service. In considering the class of tyres to be fitted on motor vehicles, we must be guided largely by the nature of the work on which the vehicle is to be employed; generally speaking, however, for service in this country, the first and foremost consideration is that of silence of running, and when a vehicle is to be employed on night service, such as many of the municipal wagons and those employed on mail and carrier service, the use of solid-rubber tyres is absolutely necessary. Steel-tyred wheels are almost exclusively used for the slower-moving steam vehicles. Generally speaking, when a vehicle is fitted with rubber tyres it may be driven at greater speeds than a steel-tyred machine, and yet the cost for mechanical maintenance can be reduced It is the experience of the authors that where steam vehicles originally fitted with steel tyres have been converted to take solid-rubber tyres, their costs for upkeep have been decreased by a greater amount than the increased cost for tyres. In one or two well-known cases, such as the old Thornycroft steamers owned by the City of Westminster Corporation (vehicles which had given between eight and ten years of service on steel tyres) have been given a new lease of life by having their wheels shod with rubber, and, notwithstanding their great age, the cost for mechanical maintenance is lower now than it was for their first year of service.

The weekly mileage of a commercial vehicle is a direct index of its earning capacity, and, whilst many 5-ton steam wagons, running on steel tyres, do not average more than 200 miles per week, there are in London, Lancashire, and various other parts of the United Kingdom many 5-ton petrol lorries which keep up an average of 400 miles per week on solid-rubber tyres. At the present time it is fairly safe to reckon that under average conditions the cost per set of solid-rubber band tyres per vehicle-mile will work out somewhat as follows: 1·5d. for a 3-ton petrol wagon, 1·75d. for a 3-ton steam wagon, 2·5d. for a 5-ton petrol wagon, 2·75d. for a 5-ton steam wagon. Or, put in another form: For a gross load of 6 tons 1·5d. per vehicle-mile, 7 tons 2d., 8 tons 2·25d., 10 tons 2·50d., and 12 tons 2·75d. As regards the sections of tyres fitted by motor manufacturers, it will generally be

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found that they select sizes and sections of tyres that are probably correct according to the tyre makers' catalogue, but it should be borne in mind that each section of tyre is constructed to carry a certain weight, and if it is assured that that weight will never be exceeded, the selection may prove a very satisfactory one. It not infrequently happens, however, that a vehicle is accidently or, for a matter of convenience, occasionally overloaded by several cwts.; in some cases, even, users are in the habit of doing this regularly, a practice which is greatly to be deprecated, and motor manufacturers would be well advised to fit such sizes of tyres as would permit of a reasonable amount of overload without serious damage, a practice which some vehicle makers have already found desirable.

The alignment for parallelism of the front wheels, of the back wheels, and of the axles respectively, should be checked from time to time, as frequent collisions with the kerb, due to side-slips, etc., and maladjustment of steering cross rods or radius rods, often lead to the alignment being incorrect. The authors need say no more on this subject than to remind members of this Institution that, taking a 32-in. wheel as a basis of argument, if a pair of such wheels be 1 in. out of alignment, a not infrequent amount, the persistent side-slip, due to this lack of alignment, amounts approximately to 3 per cent. of the travel of the car; that is to say, if a pair of 32 in. wheels be set up on an axle of indefinite length, on which they are free to approach or recede from each other, and then rolled forward, it would be found that after travelling in a forward direction for 100 miles the two wheels would be three miles apart. This movement on the axle is not permitted on any motor vehicle, because the construction keeps them at a fixed distance apart; there must, therefore, of necessity be three miles of side-slipping for every 100 miles of forward travel. This lack of alignment is a frequent cause of excessive wear on tyres. The authors draw the attention of tyre manufacturers to the real necessity of standardisation, especially as regards the bands, and to a lesser degree resiliency, and it is also desirable that a standard load unit be adopted.

### Electric Lighting of Vehicles.

Adverting to the methods and importance of lighting, the authors said: Electric lighting will come into far more extensive use than hitherto on commercial vehicles. Up to the present time, with but two or three notable exceptions, the lighting equipment of a car has been treated as an accessory, instead of having provision made for it in the original design, but if a vehicle is to be worked commercially there must of necessity be a considerable amount of night driving, and under the circumstances the lighting equipment is just as much an essential part of the complete outfit as is the ignition system, the carburettor, or any other component of the vehicle. One notable exception to this common practice of making the equipment separate is afforded by the Thomas transmission system, to which further reference is made elsewhere in the paper.

### Steam or Petrol?

While the authors have no desire to be dogmatic as to the future development of these two sources of motive power, after several years' experience of petrol and steam engines, they find no reason for favouring the former in preference to steam, except in special cases. Petrol has many minor advantages, but it also possesses disadvantages. The essential requirements of a good road motor are simplicity and reliability, and in most cases it must be capable of withstanding a considerable amount of rough usage. With regard to simplicity, there can be little question that steam still holds the field; it is on the question of reliability that the petrol enthusiast raises the challenge, but he must admit certain facts at the outset. Whereas a steamer can continue to give out its full power long after it has developed a mechanical defect, a petrol machine is dependent for its full power upon the mechanism being in perfect order, as the slightest defect will at once produce a serious loss in power, which no extra expenditure of fuel will make good. A petrol machine only works economically at about seven-eighths full load, and the question becomes one of either using a large engine to work uneconomically, or a small engine with an undesirable multiplication of gears. A steamer will continue to perform its daily work with wonderful regularity, and its defects grow gradually and do not require the same urgent attention as is the case with a petrol machine; this is a very great point to the owners. Whichever type of vehicle be employed, the best results can only be obtained if the control arrangements be such as to permit of long periods of working without causing undue fatigue to the driver, whose comfort, unfortunately, was the least considered factor in the construction of early vehicles. In this connection, the authors would emphasise the necessity of affording protection for the driver, in the form of side-doors, hoods, and screens. The paper was illustrated by numerous diagrams and photographs.

## THE USE OF BALL BEARINGS.

Within the last few years some remarkable developments have taken place in the application of ball bearings to various classes of machinery. The first great successful use of the ball bearing was in connection with bicycles and tricycles, and since then the use of this class of bearing has been extended to larger and heavier machinery. To some extent experiments have been made in the case of tramcars, while motor cars have now in very many cases ball bearings embodied in their mechanism. The drawbacks of plain bearings are, of course, well enough known, involving as they do regular attention, oiling, rapid wear, risk of running hot, and renewing. It has been calculated that in some cases the frictional loss can be reduced by 90 per cent. by the application of ball bearings.

For some time after the bicycle became a general success engineers considered ball bearings unsuitable for anything except small parts of light machinery, running at high speeds, and it would appear that one of the ideas in using them at all was to save space taken up by bearings of the ordinary type. A great deal of experimenting, however, went on with ball bearings for heavier loads and higher speeds. Some of the manufacturers now claim that they are able to offer a ball bearing for any duty and fitted to work under almost any conditions. The importance of correct housing of the bearing can be easily understood, and a great percentage of failures has been due to bad mounting. Almost every ball bearing manufacturer can prepare drawings showing the correct method of fitting and housing for any particular case. In the effort which has been made to extend the use of bearings of this kind, pains have been taken to point out the advantages to be derived from ball bearings. They are almost frictionless, and their lubrication is reduced to a minimum. A little oil is necessary to keep the balls and their races from getting rusty. The absence of friction means corresponding absence of wear, and such bearings are accordingly of great value in connection with the drives of motor cars, and also for gear boxes.

The types of ball bearings manufactured by the Skefko S.K.F. Ball Bearing Company, at Luton, are the result of minute scientific investigations. The bearings are designed so that the slightest deflections in the shaft, either permanent or occasional, are automatically taken up without any risk of damage to the bearing or loss of efficiency. They are claimed to be the most carefully designed, practical, economical, and reliable bearings on the market. The makers employ only cast-steel of the very highest quality, produced from pure Swedish iron and hardened and tempered by a special process involving five distinct operations. These bearings are also manufactured on the self-aligning principle. The company is the English branch of the S.K.F. Ball Bearing Company, of Gothenburg. Particulars of all their radial and thrust bearings, together with useful information regarding the design, fitting, and use, can be obtained on application at the chief offices at Luton.

## MOTOR OMNIBUSES IN INDIA.

The Bangalore District Board has discussed the relative cost of motor road traction and tramway traction between Bangalore and Kunigal. It was pointed out that on the motor car services in South India now being run on a commercial scale, the cost per mile had averaged 12 annas for an average load of three tons either passenger or goods, or four annas per ton per mile on good roads. In the present state of the roads in Mysore the average rate would be five annas a ton a mile. A tramway from Bangalore to Kunigal *via* Magadi would cost five or six lakhs, whereas the cost of installing a motor service would be Rs. 50,000, representing the cost of three cars at Rs. 15,000 each, and three trailers of one ton capacity each. The board resolved in favour of a motor service, and it was resolved to approach the Government for a loan of Rs. 50,000. An anna is equal to one penny, and rupees multiplied by 2/30 give pounds sterling, one of which is equal to 15 rupees.

"Heavy Motor Vehicles."—In 1905, when the Tramway and Railway World first began to devote a portion of its illustrated issues to public passenger and industrial motor vehicles, there was occasionally some difficulty in finding matter to fill the pages devoted to this feature. Nowadays the difficulty is to compress into the allotted space the number of subjects that call for treatment. It is on this account that we have had to hold over until this issue our excerpts from the paper on "Heavy Motor Vehicles," which was read some time ago before the Institution of Automobile Engineers by Messrs. Geo. W. Watson and D. S. Kennedy.

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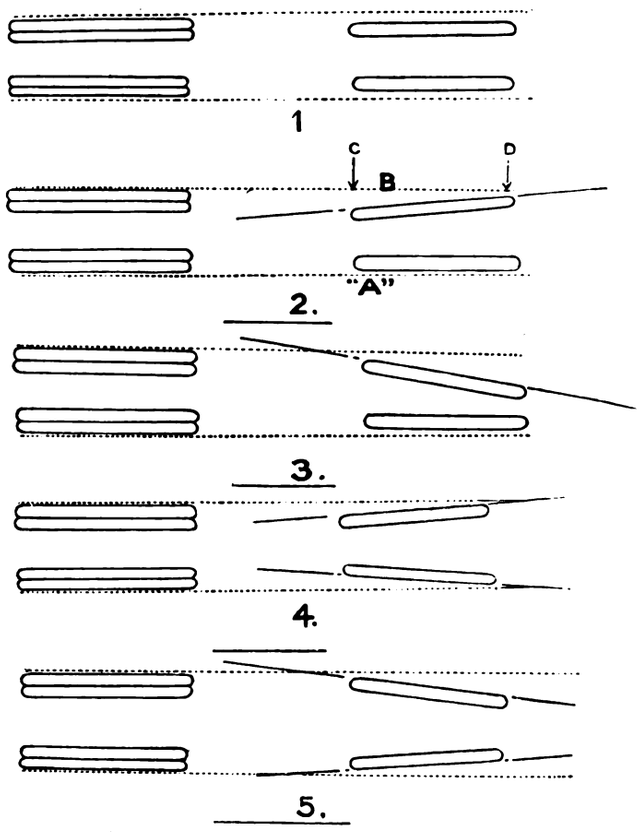
# MOTOR TRAFFIC.

## WHEEL ALIGNMENT AND CARE OF TYRES.

In the outline illustrations given on this page, Fig. 1 shows wheels in correct alignment. Figs. 2 and 3 show the two directions in which the near-side front wheel may be out of alignment in relation to the back wheels. Of course, the off-side wheels may be similarly affected, and generally, under running conditions, the error in alignment is distributed between the two front wheels, as illustrated by Figs. 4 and 5.

Error in alignment generally lies in the front wheels, and is usually caused by wear or strain of the steering rod or connections. Occasionally the fault is found in back wheels, due either to wear or exceptional shock. Errors in alignment can be readily detected by lining up the front and back wheels on one side of the chassis, as at **A** Fig. 2; the application of a straight-edge, as at **B** Fig. 2, will at once disclose the error by showing the variation in distance between the points of the wheels and the straight-edge at **C—D**.

So important is this matter that the Dunlop Rubber Company, Limited, announce that customers' vehicles may be tested for correct




alignment of wheels at any time without charge, if brought to the company's solid tyre departments, Manor Mills, Birmingham, or Priory Works, Kilburn, London, or any of the company's depots. The exceptional wear of tyres due to running wheels out of alignment is unmistakeable, the tread of the tyres having the appearance of being cut away with a rough file. A very large mileage can be obtained from a solid tyre without giving it any attention, but when it is understood how vastly greater is the mileage to be obtained from solid tyres which receive reasonable care and attention, no user will fail to take the very trifling precautions which are necessary to ensure maximum mileage.

Whilst a tyre of a certain section may give good service if fitted to a vehicle running mainly on best city roads, to get equal service on moderate provincial roads a considerably larger section tyre ought to be fitted, and this is desirable not only to ensure satisfactory tyre service, but to sufficiently protect the engine and chassis against the greatly increased vibration and shocks due to the inferior road surface.

Other important points to be borne in mind are—

Use tyres of ample section, having regard to the nature of the service.

Avoid running tyres over loose stones, and when this is not possible, drive *slowly*; the best rubber tyre ever made can be destroyed by being driven *rapidly* over loose stones.

Carefully look over all tyres after each day's service, and remove any stones or other foreign matter embedded in the tyres.

Avoid locking the wheels with the brakes. Occasionally tyres are so badly skidded as to grind down some part of the steel band.

See that the tyres are not allowed to stand upon oily floors, and that no oil is allowed to get into contact with the rubber. Oil rapidly destroys rubber.

Jack up a vehicle when out of use for any extended period. The whole weight of a vehicle should not be carried by one point on the tyres, as would be the case in a vehicle used for season traffic and put up for some months in succession.

## COMMER CARS IN VENTNOR.

Ventnor Road Cars, Limited, have inaugurated a service of single-deck motor omnibuses which in their regular daily service climb a gradient of 1 in 5. These machines have been supplied by Commercial Cars, Limited, and, as will be seen from our illustration, have a most pleasing appearance. The chassis is fitted with the "Commer Car" standard 32-H.P. 4-cylinder engine, 110 mm. bore by 140 mm. stroke.

"Commer Car" Omnibus in Ventnor.

The speed control enables a variation from 250 to 1,250 revs. per minute. Special gearing has been installed in the patent gear box, and this ensures the regularity of the service on one of the worst gradients in this country. The omnibus is arranged to seat 25 passengers, and is similar to those recently supplied to the Cheltenham and District Light Railway Company.

## ROAD BOARD APPOINTMENTS.

The Road Board have appointed Mr. Henry Percy Maybury, M.Inst.C.E., the county surveyor of Kent, as chief engineer to the Board. Colonel Crompton, C.B., will continue to act, as he has hitherto done, as consulting engineer. Mr. Maybury will commence his new duties as soon as the Kent County Council fill the vacancy in the post of county surveyor, which will probably be in the month of November next. The Road Board have also added to their Engineering Advisory Committee Mr. E. Parnell Hooley, the county surveyor of Notts., and Mr. Alfred Dryland, the county surveyor of Surrey. Lord Montague, of Beaulieu, has been appointed a member of the Board in place of the late Sir Charles Rose.

POLACK TYRE MILEAGES.—The set of tyres removed for exhibition purposes from a 2-ton "Commer" Car mentioned in our report of the recent motor vehicle show at Olympia, had previously covered 27,000 miles, the figures 2,700 shown in our report being a printer's error. We understand that the lagging method of fitting Polack tyres has been in operation for some years with complete satisfaction.

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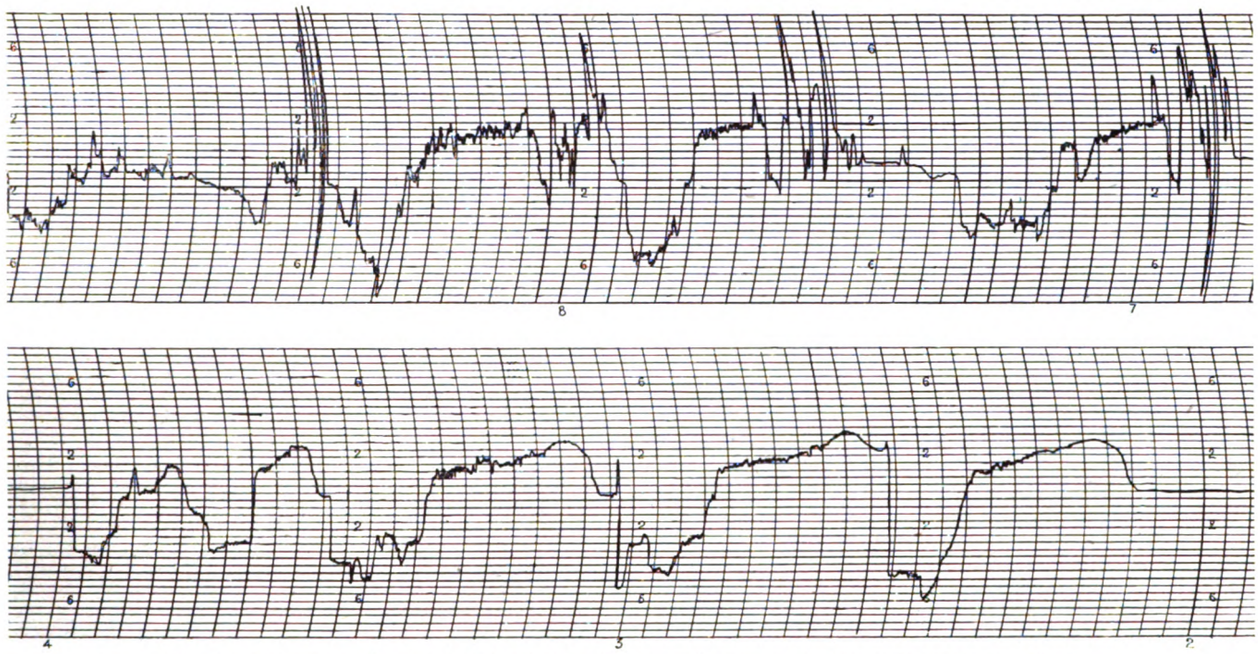
# MOTOR TRAFFIC.

## TRANSMISSION STRESSES.

By means of a Wimperis accelerometer the appended records have been taken in order to compare the acceleration and retardation effects of changing speed and braking on a gear-driven omnibus and a 40-H.P. Tilling-Stevens petrol-electric omnibus. The records show the acceleration or retardation in feet per second per second, above and below the zero line respectively. The speed changes of the gear-driven vehicle are indicated on the upper record, and of the petrol-electric vehicle on the lower one. The object of the records, which were made under identical conditions on the same road and on the same day, is to determine transmission stresses. It is calculated that the intermittent accelerations on the gear-driven vehicle, exceeding 8 ft. per second per second shown by the record result in a stress at the rim of the road wheels of at least 560 lb. per ton, while in the Tilling-Stevens petrol-electric machine in no place is the acceleration shown to be more than $3\frac{1}{2}$ ft. per second per second, the transmission stresses in this case being less than 245 lb. per ton on the rim of the road wheels.



Charts of Acceleration and Retardation for Gear-Driven and Petrol-Electric Omnibuses.

## "COMMER CAR" OMNIBUSES FOR NORTH WESTERN RAILWAY.

The six "Commer Car" omnibuses shown in the accompanying illustration are a portion of the fleet used by the London and North Western Railway Company for the conveyance of passengers and luggage from Euston to all parts of London. These machines, which are owing to their convenience extremely well patronised, can carry 10 passengers with 15 cwts. of luggage. They are nearly as handy in traffic as taxi-cabs, and their speed may be equally great.

In addition to these small motors, the North Western Railway have 20 other "Commer" cars, most of which are used in tourist centres in North Wales. They are 32 H.P. capacity and carry 23 passengers. In the summer and autumn months a great and increasing business is done with these vehicles, owing to the opportunities they give for seeing the country.

"Commer" Cars Used in London by the London and North Western Railway.

BATH TRAMWAYS NEW MOTOR SERVICES.—The Bath Electric Tramways Company have decided to increase considerably their motor service, and have organised a system of extended tours to South Wales, covering some 760 miles in six days, at an inclusive charge with first-class hotel accommodation of six guineas. The service will be maintained by a fleet of motor chars-a-bancs, and Commercial Cars, Limited, have received a further order for six of these vehicles, making in all 16 machines of this type which the Luton firm have supplied to the company.

SOUTHPORT OMNIBUSES.—In a paragraph of our issue of August 14 in regard to motor omnibuses of the W. A. Stevens petrol-electric type, the name of the town council was erroneously given as Southend instead of Southport.

TRAMCARS OR OMNIBUSES FOR NUNEATON?—At a meeting of the Nuneaton Council, a letter was received from the local Co-operative Society urging the desirability of securing a tramway service. It was pointed out that the establishment of an omnibus system would involve an Act of Parliament. Consideration of the subject was deferred.

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# MOTOR TRAFFIC.

## WHAT BECOMES OF OLD CARS.

The accompanying illustration shows one use, at all events, to which old motor cars may be put. The car in question is a 35-H.P. Daimler, and the story connected with it is to the following effect: The car was originally purchased by a Mr. Leonard, of Vancouver. Subsequently it was employed as a stage carriage at Sooke, Vancouver Island. A year later it came back to Vancouver, and was put on to local work there for some time. Eventually, it was bought by the Western Power Company, and shipped to their power-station at Stave Lake. There they removed the rims and tyres from the wheels, replaced the front axle by a rigid one, and fitted flanged rims to the old wooden wheels, so as to make the vehicle suitable for running on a railway. While

**Road Car Applied to Railway Use.**

this was being done the radiator was destroyed, so there was constructed instead a vertical pipe radiator with ¾ in. iron pipes connected underneath with 1¼ in. pipes. The tonneau of the body was removed, and two long board seats were substituted, like omnibus seats.

The car is used for a trip of about six miles, on a railway of standard guage, with 40 lb. rails, having gradients of 6¾ per cent., and curves of 20 ft. radius. Guard rails are used on the curves. The vehicle can carry about 13 passengers, if four stand on the running boards. The trip can be made in nine minutes, but it is reported that 12 minutes is hair-raising enough. The charge is 25 cents per head, and extra for luggage. The company say that the car is quite satisfactory, and they run it as often as they can to save using a locomotive, which uses ½ ton of coal per trip, and requires three men to work it.

## A NORTHAMPTON PROBLEM.

A problem now before the Northampton local authority is whether traffic facilities shall be extended by means of tramways or omnibuses. At the last meeting of the Council the town clerk reported that he had received several communications on the question of the extension of the tram lines to Far Cotton from Northampton Property Protection Society and the Ratepayers' Association. The last named called upon the Council not to lay tram lines until they had experimented with omnibuses, which they could do during the period of grace allowed them by the Act of Parliament. Councillor Lewis, chairman of the Tramways Committee, remarked that tramcars were superior to omnibuses in the matter of safe travelling, and they were more economical. The cars could be run at 1d. per car-mile less than the motor 'bus, and on the Far Cotton service that would mean a saving of £400 to £500 a year. Since the figures of the committee were prepared the price of petrol had greatly increased, and the comparison of the omnibus with the tramcars was the worse to that extent. The immense success of the motor omnibus in London led people to wrong conclusions as to its utility in other centres. The 'buses in London were successful for reasons peculiar to London, for the tramways did not there touch the centres of the traffic. The mobility of the omnibus made it useful, and the committee had considered whether there were any routes for it within the borough boundaries not covered by the tramway system.

ROAD MATERIAL TO WITHSTAND MODERN CONDITIONS.—The Works Committee of Islington recently visited all the East London boroughs in search of a road material which will withstand modern conditions. The committee inspected many different materials.

## LONDON MOTOR TRAFFIC.

THE POSITION AND OPINIONS OF MR. W. W. BEAUMONT.

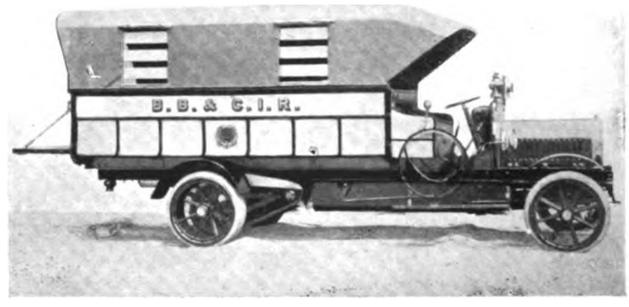
In the House of Commons, a few days before the close of the session, Mr. FRED HALL (Dulwich—U) asked the Secretary of State for the Home Department if Mr. W. Worby Beaumont, who acted as adviser to the Commissioner of Police in regard to the construction of licensed motor vehicles, was also consulting engineer to any omnibus company running licensed vehicles in the Metropolitan Police area; if so, the dates when he took up these respective positions; what were the duties he performed in regard to motor vehicles, and did these duties include the supervision of tramcar design; if Mr. Beaumont had expressed any opinion as to the advantages or disadvantages of tramways as a means of urban street transit; and, if so, whether this opinion was expressed in his capacity as adviser to the police or to the omnibus companies.

Mr. MCKENNA replied: Mr. Worby Beaumont has been adviser to the Commissioner of Police in regard to the construction of licensed motor vehicles since November, 1905. His duties, which are advisory only, do not include the supervision of tramcar or of omnibus or of cab design, but he is consulted on technical engineering points affecting the construction of cabs and omnibuses, and occasionally of tramcars. I believe that Mr. Beaumont has for many years given public expression to his personal views as to the advantages or disadvantages of various means of street transit, but these are his personal views only, and he has not been asked to express any opinion in an official capacity. Mr. Beaumont at the time of his appointment as adviser to the Commissioner of Police was, I believe, already consulting engineer to all the motor omnibus companies then plying in London, and also to various tramway undertakings in London and elsewhere.

It will be remembered that the Select Committee considered that the technical adviser to the Chief Commissioner should be an independent official.

## MOTOR PARCELS VANS IN INDIA.

The delivery of a 3-ton motor van with a 4-cylinder engine of 32 H.P. by the Albion Motor Car Company of Glasgow, to the Bombay, Baroda, and Central India Railway Company, has increased the number of motor vans now in this company's service to four. The latest vehicle, fitted with solid tyres (twin on rear wheels and single on the front), has a speed of from 12 to 15 miles an hour when fully loaded. The body is tastefully painted in the company's standard coaching stock colours, viz., cream panels with mouldings picked out in dark olive green. Since the opening of the through Nagda-Multra route this railway has secured a large portion of the fruit traffic from the Punjaub, and the four vans now in use are barely sufficient to cope with this traffic during the season.




**Motor Van—Bombay, Baroda, and Central India Railway.**

ROAD MAINTENANCE.—Resolutions were passed at the annual conference of the Urban District Councils' Association at Llandrindod Wells, suggesting that motor omnibus companies should make a contribution towards the cost of road maintenance.

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# MOTOR TRAFFIC.

## ROAD BOARD'S THIRD REPORT.

The third annual report of the Road Board has been issued from the Treasury in the form of a White Paper. It is stated that the total receipts for the year ended March 31, 1913, from carriage licence duties, motor spirit duties, and interest on investments and loans, amounted to £1,229,003, and the net payments to £467,069. For the whole period from 1911 to June 30, 1913, the receipts amounted to £3,556,995, making, after a deduction of £31,000 for administrative expenses, a balance of £3,525,995 available for grants and loans. During the year applications for advances were made to the extent of £1,508,272, £1,206,951 being for improvement of road crusts, £190,288 for road widenings and improvement of curves and corners, and £61,769 for the reconstruction and improvement of bridges. Grants indicated amounted up to June 30 last to £2,596,752, and loans to £838,481, leaving £90,762 as the net receipts in excess of commitments. The grants and loans made fell short of the grants and loans indicated by £1,613,028 up to March 31, and by £1,960,440 up to June 30. The total grants up to March 31, 1913, were £1,130,722, whilst the amount paid under the grants was £632,541, the balance unpaid being £498,181.

At the present time the Board are making grants on the assumption that they can safely indicate a sum of about £1,700,000, in addition to the indications made up to June 30, 1913. Out of the estimated figure of £1,700,000 the Board have already offered or allocated £113,120 to highway authorities in Greater London, and £269,485 to county borough councils in England and Wales in excess of the grants already made or arranged for. They expect to receive applications and to be able to arrange grants for the whole of the £1,700,000 in time to secure that highway authorities will be in a position to include the assisted works in the programme of work which will be covered either by supplemental estimates for the current year or by their annual estimates for the ensuing year.

The grants and loans made up to June 30 are apportioned as follow: Improvement of road crusts, £1,210,012; road widenings and improvement of curves, gradients, and corners, £120,466; road diversions, £29,395; reconstruction and improvement of bridges, £53,842; and new roads and bridges, £61,078; a total of £1,474,793.

The London County Council not having accepted the Board's scheme for the construction of a new road from Kensington to Hounslow, the Board had provisionally arranged for the Middlesex County Council to seek powers to construct a new road from Kew Bridge to Hounslow, the Board to contribute £400,000 towards the cost of the scheme, which will exceed £500,000. When the first-mentioned scheme fell through the Board proceeded to allocate advances totalling £280,000 to the Metropolitan Borough Council and other highway authorities, and £400,000 to provincial authorities for works of road construction and improvement. Having regard to the rapid extension of omnibus and heavy motor vehicle traffic in Greater London, the Board think that this allocation will serve the public interest as well as that originally suggested for a new approved road.

## DEVELOPMENT COMMISSION AND RURAL TRANSPORT.

The policy to be adopted in regard to the development of rural transport is now under the consideration of the Development Commission, although that body were appointed three years ago to carry out that and other objects. Data is being collected as to the results obtainable by road motor traction as compared with light railways as a means of affording the farmer the best means of transit of his produce and the importation of feeding stuffs when required upon his farm. The deliberations of the Commission are responsible for delaying the replies to requests received for grants from certain light railway undertakings in Yorkshire, which have been sanctioned by the Light Railways Commission, and have been favourably reported upon by experts appointed by the Board of Agriculture to consider the applications. Such reports had previously been made a qualification for grants from the Development Commission.

WHERE OMNIBUSES ARE WELCOMED.—On the grounds that motor omnibuses do no more damage to the roads than motor cars, and that they are not so dangerous to the public, Epping Urban Council have declined to support the Rural Council in petitioning all the highway authorities in Essex to oppose omnibus services to Epping, Chingford, and other places bordering on Epping Forest. Speakers at a meeting of the Urban Council also urged that the vehicles bring more trade to the town than they take out.

## MOTOR TRAFFIC NOTES.

TRAMWAY COMPANY TO RUN OMNIBUSES.—Motor omnibuses are to be run between Kidderminster and Bewdley by the local tramway company.

THE ANNUAL OUTING OF THE STAFF OF CHRISTOPHER DODSON, LIMITED, coachbuilders, Westminster, was held at Brighton, there being about 200 present.

GLASGOW CORPORATION AND OMNIBUSES.—The Tramways Committee propose to make application for further powers to run omnibuses in the city and in the adjoining districts.

LONDON GENERAL OMNIBUS CHARS-A-BANCS.—In addition to supplying motor omnibuses to private parties for outings, the London General Omnibus Company this summer have placed a number of chars-a-bancs in similar service.

TO THE MOORS BY OMNIBUS.—The motor 'bus service of the Sheffield Corporation takes folks to the moors, and it is now urged that a service should be run to Ringinglow, one of the most fascinating of the moorland districts within easy reach of town.

OMNIBUSES FOR CREWE.—The Town Council has decided to promote a bill to enable them to run motor omnibuses within the borough and to and from Crewe, Nantwich, Willaston, Haslington, and Sandbach. The town is now served only by horse omnibuses.

THE RIVALRY IN LONDON.—Motor omnibuses have started running from Edmonton, and in consequence local residents are urging the running of through tramcars to the City *via* Stamford Hill. As one correspondent says: "People use the 'buses because they save time and trouble of changing at Stamford Hill."

AN OPENING FOR OMNIBUSES IN WALES.—At a meeting of the Penybont Council recently, it was decided, on the recommendation of a conference of local Councils which had considered the question of railway facilities in the district, to invite motor omnibus companies to establish a motor service.

ENCOURAGEMENT FOR MOTOR OMNIBUSES.—In order to encourage the Gateshead and District Tramways Company to run a regular service of motor 'buses between Heworth and Hebburn, Hebburn District Council has instructed the surveyor to repair the high road between the two places as quickly as possible.

MIDDLESEX OMNIBUS TRAFFIC.—Mr. Wakelam, the county surveyor, writes in his annual report of the damage to roads since motor 'bus services have been inaugurated. The necessary extra expenditure for maintenance has caused the upkeep charges to increase to an alarming extent, and with the proposed extensions of omnibus traffic from the metropolis through Middlesex, further increased expenditure must undoubtedly be looked for.

TRAMWAYS V. OMNIBUSES AT OXFORD.—The latest plan for providing Oxford with a modern electric tramway service is arousing a good deal of opposition, and an agitation in favour of motor omnibuses instead of tramcars is proceeding. The position is, however, that the National Electric Construction Company have an agreement with the City Council, under which the former are to run electric tramcars, and without their consent it will be impossible to substitute omnibuses.

EDISON ACCUMULATORS, LIMITED.—This company was registered on August 5 with a capital of £150,000 in 135,000 7 per cent. participating preference shares of £1 each, and 300,000 ordinary shares of 1s. each. The first directors, to number not less than three and not more than eight, are Lord Montague of Beaulieu, 62, Pall Mall, S.W.; Colonel H. C. L. Holden, Gifford House, Blackheath; A. L. Pearce, Worcester House, Walbrook, E.C.; and J. F. Monnott, 49, Old Broad Street, E.C.

COVENTRY AND OMNIBUSES.—Councillor Pridmore, chairman of the Tramways Committee, has announced that they had under consideration the question of an extension to Earlsdon, but he thought that first they would have to try motor omnibuses, which they could do quickly, but, from the Corporation point of view, they must take into consideration the wear and tear on the roads. Having regard to the congested centre of the town, he thought they should get a small fleet of six omnibuses.

TRAMWAY AND OMNIBUS PASSENGERS IN LONDON.—Mr. Buxton (President of the Board of Trade), replying to Mr. W. Rea in the House of Commons on August 13, said that the number of passengers carried by tramway authorities working in Greater London during the year ended December 31, 1912, in the case of companies, and March 31, 1913, in the case of local authorities, amounted to 798,672,549, and the number carried during 1912 by omnibuses was upwards of 500,000,000. The corresponding figures for the first half of 1913 could not be given.

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# MOTOR TRAFFIC.

DAIMLER OMNIBUSES AT BIRMINGHAM.—The accompanying illustrations show specimens of the 40-H.P. Daimler omnibuses recently put into service by Birmingham Corporation. Ten of these vehicles in all were ordered, and practically they are all now in service. They have attracted much attention by their silent running and fine appearance.

**Birmingham Daimler Omnibuses.**

BETTER ROADS FOR THE ISLE OF WIGHT.—To secure an improvement of the roads, the local Council are considering the question of taking up a large loan for strengthening the foundations of some of the main roads, with the assistance of grants from the Road Board. A system has just been adopted by which one man will be made entirely responsible for keeping in order a specified length of road, instead of having road foremen for districts larger than they can personally attend to. This involves the appointment of some 50 men in place of about half that number of road foremen.

EFFECT OF OMNIBUS COMPETITION WITH RAILWAYS.—Railway traffic returns for 1912, issued by the Board of Trade, indicate the manner in which motor omnibus services have been affecting railways. During the year the motor omnibus services were much improved and extended, especially in the metropolis and the adjacent districts. In some degree these services have created their own traffic by providing facilities for rapid locomotion in places where no such facilities previously existed, but their effect in reducing short-distance railway travelling must nevertheless have been considerable.

THE TRAFFIC PROBLEM IN URUGUAY.—Mail advices show that in Monte Video, where some two years ago the Uruguayan Government established a service of small motor 'buses, the service has been abandoned. The reason given is the cost of upkeep due to the bad condition of the highways. The Government have stated that as soon as the roads have been asphalted this service will be resumed. Discussing the probability of omnibus competition with tramways in the Argentine, *The Review of the River Plate* observes that the roads in Monte Video are better than those in Buenos Ayres.

A MAUDSLAY CATALOGUE.—The Maudslay Motor Company, Limited, have issued a handsome catalogue on industrial and public service vehicles. The catalogue contains a brief description of a Maudslay engine with drawings and numerous photographic illustrations of various parts, together with price list of the chassis and specifications of the respective types. Numerous types of lorries, vans, chars-a-bancs, and omnibuses are set out. Users of commercial vehicles will find running costs which are given for machines of various capacities, of much interest. A full list of spare parts concludes a publication of more than usual interest.

OMNIBUSES AS TRAMWAY FEEDERS.—A discussion raised by Councillor Morris, at the Doncaster Council meeting, on a motion that the Council should consider the advisability of purchasing six or eight motor 'buses, as an experiment, to run between Doncaster and Brodsworth and Adwick-le-Street and Balby to Edlington, has excited considerable interest in the borough. Interviewed on the subject, Mr. Rayner, the manager of the Corporation tramways, says he believes in the adoption of 'buses as "feeders" to the cars, but not as a substitute for them. The cost of a motor 'bus and a tramcar, said Mr. Rayner, was identically the same, about £850, but whereas an expenditure of 9d. per mile was involved in running an omnibus, a tramcar only cost 6d. per mile to run. This, of course, does not include the cost of laying a track, but Mr. Rayner thinks sinking fund and interest on this could be met by an extra 2½d per mile.

MAUDSLAY CHARS-A-BANCS IN SERVICE.—The accompanying photographs illustrate one of two chars-a-bancs which the Maudslay Motor Company have supplied to the Oldham Equitable Co-operative Society. This societ arranges long excursions from Oldham down to the

**Maudslay Chars-a-Bancs.**

Midlands, South of England, and Central and North Wales, the trips usually covering about four or five days. The first illustration shows the vehicle collecting its passengers in the centre of Coventry, previous to a trip to Cheltenham, and the second illustration shows it passing along the Warwick Road on the outward journey.

TRADERS AGAINST TRAMWAYS.—Interviewed with reference to the desire of the London County Council to construct a tramway from the Marble Arch to Cricklewood, Mr. A. Garrould, a member of the Marylebone Council, says that more than 80 per cent. of the shopkeepers in Edgware Road were opposed to the scheme. "A few years ago," he said, "I gave evidence before the Select Committee of the House of Commons in favour of this extension, but in those days we were being badly served by the omnibuses. Things are altered now, and we are so well served that practically everybody in the road is opposed to the introduction of the tramways."

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THE

# Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### ILKLEY URBAN DISTRICT COUNCIL.

ELECTRICITY SUPPLY.

(In the Ilkley Urban District and Township of Middelton).

The Council are prepared to receive tenders for Electric Generating and Distribution Plant as follows:—

Section 1.—Prime Movers.
Section 2.—Station Equipment.
Section 3.—Cables and Distribution.
Section 4.—Overhead Travelling Crane.

Copies of the specifications and general conditions can be obtained from the undersigned or from the Consulting Engineer, Mr. George Wilkinson, Beech Mount, Harrogate, on payment of a fee of two guineas in respect of each section applied for. The deposit will be refunded on the return of the specifications, accompanied by a *bonâ-fide* tender.

Tenders, sealed and endorsed "Tender for Electricity Works," must be sent to me at the Town Hall, Ilkley, not later than Tuesday, the 7th day of October, 1913.

The Council do not bind themselves to accept the lowest or any tender, and reserve to themselves the right of accepting the whole or part of a tender.

By order, F. S. ECKERSLEY,
Clerk of the Council.

Town Hall, Ilkley,
September 5, 1913.

### ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria is prepared to receive tenders for:—

Overhead Electrical Equipment of Permanent Way and Overhead Transmission Mains

in connection with the electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from the Agent-General for Victoria on or after Monday, September 15, 1913. Any tenderer requiring information in addition to that contained in the specification may apply to the Consulting Engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification is £5 5s. for the first copy, and £2 2s. each for any further copies. Sums paid for copies will be refunded on receipt of a *bonâ-fide* tender for the whole of the works included in the specification.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways—Tenders for Electrical Equipment of Permanent Way and Overhead Transmission Mains," are to be addressed to the Agent-General for Victoria, and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 noon on November 15, 1913.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

### LIVERPOOL CORPORATION TRAMWAYS.

CONTRACT FOR THE SUPPLY OF TICKETS.

The Tramways and Electric Power and Lighting Committee are prepared to receive tenders for three years' supply from the 1st January, 1914, of Passengers', etc., Tickets. The approximate quantity used per annum will be 150,000,000.

Copies of specification, general conditions, and form of tender may be obtained on written application to the General Manager, Corporation Tramways, 24, Hatton Garden, Liverpool, where standard samples of the tickets may be viewed any day (except Saturday and Sunday) between the hours of 9 a.m. and 5 p.m.

The Corporation do not bind themselves to accept the lowest or any tender.

Tenders must be posted in the official envelope provided, duly sealed, addressed to the "Town Clerk, Municipal Buildings, Liverpool," and endorsed "Tender for Tickets," so as to be received not later than 10 a.m. on Thursday, September 25, 1913.

EDWARD R. PICKMERE,
Town Clerk.

### MATLOCK URBAN DISTRICT COUNCIL.

TRAMWAY CABLE.

The above Council are prepared to receive tenders for about 1,967 Lineal Yards of Patent Steel Wire Tramway Cable, with Manilla Core (3¼in. in circumference), delivered at their Depôt, Matlock, carriage paid.

Particulars, specifications, and terms as to payment may be obtained from Mr. C. P. Foster, Tramway Manager.

Tenders, accompanied by samples of wires, to be delivered at my office (marked "Cable") not later than 12 noon, Saturday, September 20, 1913.

The Council do not bind themselves to accept the lowest or any tender.

R. TAYLOR,
Clerk to the Council.

Town Hall, Matlock,
September 3, 1913.

### LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply:—

(1) Rails.
(2) Fishplates.
(3) Bearing-Plates.
(4) Coachscrews and Dogspikes.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Friday, September 19, 1913, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
September 10, 1913.

### BOROUGH OF HAMMERSMITH.

The Borough Council invites tenders for the supply of 1-125 h.p. Alternating Current Motor. Full particulars, specification, and form of tender may be obtained from Mr. G. G. Bell, Borough Electrical Engineer, 85, Fulham Palace Road, Hammersmith, W. Sealed tenders, endorsed "Tender for Motor," must be delivered to me at the Town Hall, Hammersmith, not later than 4 p.m. on Wednesday, September 24, 1913.

The Council does not bind itself to accept the lowest or any tender.

LESLIE GORDON,
Town Clerk.

Town Hall, Hammersmith, W.,
September 9, 1913.

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## BOROUGH OF WORTHING.

EXTENSION OF PLANT—ELECTRICITY WORKS.

The Corporation invite tenders for the supply, delivery, and erection complete at the Electricity Works, Worthing, of One Generating Set, consisting of a Diesel Oil Engine and a Direct Coupled Direct Current Generator.

Forms of tender, specification, plans, and general conditions may be obtained from the undersigned on payment of a deposit of £2 2s., which will be returned on receipt of a *bonâ-fide* tender, and in the case of the successful tenderer on the execution of the contract.

Sealed tenders, endorsed "Generating Plant," must be delivered at my Office not later than 12 noon on Monday, the 29th day of September, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

J. KENNEDY ALLERTON,
Town Clerk.

Municipal Offices, Worthing,
September 8, 1913.

## POSITIONS VACANT.

### TORQUAY TRAMWAYS COMPANY, LTD.

PLATELAYER.

Applications are invited for the above position. Candidates must have experience in maintenance work, and must be able to, or willing to learn to, drive a car when required.

Applications, stating experience and wages required, together with copies of testimonials, to be forwarded to the undersigned.

H. HOLLIDAY,
Engineer and Manager.

Car Sheds, Torquay.

### MAIDSTONE CORPORATION TRAMWAYS.

INSPECTOR.

The above Corporation invite applications for the position of Inspector at a commencing salary of 33s. per week, rising to 35s. at end of first year, if satisfactory. Apply, stating age, qualifications, and present occupation, accompanied by copies of not more than three recent testimonials to be sent on or before September 22, to the

GENERAL MANAGER,
Tram Depôt,
Tonbridge Road,
Maidstone.

### DEPOT CLERK.

Wanted immediately; Shorthand and Typing essential. Send detailed particulars of previous experience, copies of testimonials, age, wage asked, and when could commence duties, to Manager, Tramways, Colchester.

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FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).

GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.

BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.

SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.

SWITZERLAND. G. Sigerist, 8, Mitti, Haldenstrasse, Winterthur.

ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.

SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.

SOUTH AFRICA. F. Peabody Rice, 24, Standard Bank Buildings, Johannesburg.

AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.

NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.

JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

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SATURDAY, SEPTEMBER 13, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## BONUS SCHEME REDUCES ACCIDENTS.

The Socialistic perversion of the trade union idea has come near to placing the Manchester car hands in a ridiculous position. One of the desires of the street corner orators who have set out to capture the trade unions is to reduce all workers to a dead level of exertion and wages. The evils that would overtake British commerce if these folk had their way are too evident to need enumeration, and it follows that if tramway employees came within the same influence the incentive to efficient discharge of duty would vanish. The result then would be that the complaints of the travelling public, which are now too numerous in some places, would become overwhelming. Fortunately for the Manchester men, they have been rescued from a foolish position by the keener perception of their national executive's secretary, who, as an alderman of Salford, has obtained a more business-like impression of men and things than is shown by the majority of union organisers. The Manchester tramwaymen have for some time raised opposition to a bonus system which is in operation on that undertaking, but on the advice of Alderman Jackson, who urged that "it would be very foolish to refuse what is really an advance in wages," they have come to the sensible resolve to withdraw from their untenable position. Manchester is not the only place where similar opposition has been shown to laudable efforts in the form of bonus schemes to induce car workers to put forward their best endeavours. An argument commonly used is that a bonus based on, among others things, current consumption, leads to motormen taking risks in the control of their cars. It is further contended that dissension is engendered between a motorman and a conductor. The experience of the Manchester tramway department, however, does not bear out such contentions. Moreover, it goes to show that these forebodings art not only falsified, but that accident claims are reduced in a remarkable manner. Under the bonus scheme 13s. is allowed to drivers who for thirteen consecutive weeks have been free from blameable accidents and whose current consumption records have been satisfactory. This plan has been in operation since February 2, 1911, and for the last year 93 per cent. of the drivers earned the bonus. A bonus of 1s. to conductors, and 6d. to trolley boys for each complete week worked is allowed quarterly to all who are free from blameable accidents and whose records during that period are satisfactory. This scheme has only been in operation since May 1 last. The first quarter's bonus has just been paid, and 94 per cent. of the conductors and 82 per cent. of the boys received bonuses. In an interview which he gave before setting out to report on street traffic conditions in the most important centres on the Continent, Mr. McElroy, the general manager, stated that the bonus for motormen has worked very well, and in no instance has it been stopped because of current consumption, this being merely of secondary importance. A remarkable result of the first year's working of the scheme is that the amount paid out in accident claims went down by just the amount that was paid out to the drivers in bonus. In other words, the money that formerly went into the pockets of the public now goes to the drivers. At the end of the second year's working Mr. McElroy hopes to see even better results. Nearly all the men, he says, earned the bonus; it really acts as a valuable incentive to do good work, and the system has recently been put into operation for the conductors. The wisdom of well-considered plans for obtaining the maximum efficiency on the part of employees has also been shown during the past few years at Bradford, where Mr. C. J. Spencer has made increase of wages payable only when a man has given efficient service. The firmness of the management in this respect, combined with readiness to consider any representations put forward by the men for improved conditions, were the factors that led the employees' union to pass, as recorded in our issue of September 6, a resolution tendering to the Tramway Committee and the manager their thanks for generous treatment and unfailing courtesy and consideration. Tramwaymen generally would do well if they took to heart the Bradford men's expression of hope that the conditions of employment now prevailing may result in a higher standard of service.

## SHEFFIELD EMPLOYEES IN A QUANDARY.

Citizens of the British steel capital are held in high repute as being men of discernment, high business capacity, and honour, but unless some friend comes to the rescue of the union employees among the tramwaymen there is a danger that those qualities will be tarnished as far as the working classes are concerned. The difficulty facing the men is their inability to understand that arbitration proceedings on questions relating to conditions of employment—to be satisfactory to all concerned—must embrace reasonably wide terms of reference. Continuing the generous treatment represented by advances totalling £15,000 in nine years, the Tramways Committee recently decided to grant time and a-half payment for Sunday labour to motormen and conductors of five years' service. Because the Committee refused to extend this concession to all employees there were threats of a strike. An offer by the Committee to submit the question to arbitration recalled the agitators to their senses, and it is worthy of

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note that before reason was again enthroned the newspapers had shown, through their editorial and correspondence columns, that public opinion was entirely against the men. On the appointment of arbitrator the two parties were agreed to select his honour Judge Benson, but when it came to settling the terms of reference there was a disagreement as to the extent of the question to be submitted. The Deputy-Town Clerk drew up draft terms which asked his Honour to decide on the men's original application for an increase of pay (which the Corporation have in part granted), having regard (1) to the present terms and conditions of service and pay and emoluments of the employees, as compared with the terms and conditions of service and pay and emoluments obtained in other tramway undertakings; (2) to the improvements in the terms and conditions of service and pay and emoluments of the employees which had been made from time to time in the past; and (3) to such other facts and arguments as might be submitted by either party in support of or against the application. These terms, we believe, are identical with those accepted by the Manchester Tramways Committee and their employees for the arbitration proceedings in that city a year or two ago. The possibilities that would be afforded by the third heading ought to satisfy intelligent persons, but not so the Sheffield men. They revealed the weakness of their case by declaring that the point at issue is one of Sunday pay only, and that the arbitration should be limited to the question "whether time and a-half for all employees for Sunday labour who are receiving less than that rate shall be granted to all employees other than motormen and conductors with five years' service." They object to heads (1) and (2) of the terms of reference, and although Alderman Jackson, the general secretary of the Union, agreed that the Corporation should give evidence under those heads, the local officials of the Union are not prepared to admit such evidence. Further, the employees so far forgot what is due from a party to an arbitration as to ask the Committee to re-open negotiations and to receive a deputation to discuss the advisability of further extending the concession of time and a-half for Sunday labour. The Committee decided that having agreed to refer the matter to arbitration they were unable to adopt the suggestion. When the Committee's report came before the Corporation on Wednesday, their action was confirmed without discussion, after the reading of a letter from Sir William Clegg, the chairman, urging the Council to support the Committee's adherence to the terms of reference. Any alteration, he declared, would be unfair not only to the Committee, but to the ratepayers. The objections raised by the Union officials afford corroboration of the report recently presented by the general manager, showing that the Sheffield motormen and conductors are the best paid in the United Kingdom.

## BRISTOL TRAMWAYS PURCHASE QUESTION.

The Bristol Corporation will shortly be called upon to decide whether they will purchase the Tramways and Carriage Company's undertaking. A report on the subject, signed by Mr. George Pearson, the chairman of the Special Committee appointed to investigate the matter, stated that after having obtained all the information possible with reference to other undertakings, and with a view of arriving at an approximate valuation of the Bristol undertaking, it was felt that expert advice should be obtained. Accordingly the assistance was obtained of Mr. J. B. Hamilton, general manager, Leeds Corporation tramways, and of Mr. J. F. C. Snell, consulting engineer, of the firm of Messrs. Preece, Cardew, and Snell, both of whom have had a very extensive experience of tramways in this country, and also in the valuation and purchase of undertakings under the Tramways Act, 1870. These gentlemen were instructed to endeavour to estimate the cost of acquiring the undertaking, and to state the probable income to the Corporation if the latter should determine to acquire and work the tramways, having regard to the risk which might possibly arise of tramways becoming an unpopular or obsolete form of traction, and having regard also to the cost of running other competing forms of traffic; whilst they were further invited to give an opinion as to whether it would be advisable for the present to leave the tramways in the present company's hands under the terms of the Tramways Act, 1870, or whether they would recommend the Corporation to purchase the undertaking and (1) either work it themselves or (2) leave it to the existing or any other company. Finally, they were asked to advise as to whether it would be advantageous or otherwise to the Corporation for them to enter into an agreement to refrain from exercising their option of purchase for any given period in consideration of either a capital sum or an annual rental.

Messrs. Hamilton and Snell have advised that in their estimate the Corporation possess a very valuable option, which it would be advantageous for them to exercise on May 1, 1915, in the absence of any important or radical changes. The committee feel that it is not advisable to publish the report of the experts, but think that the Council should at the present time put themselves in a position to work or otherwise operate the undertaking to the best possible advantage of the city, in case the Council decide to acquire it at the time when the option to purchase can be exercised.

The Corporation can acquire the greater portion of the tramways in 1915, and the committee recommends that the Corporation should apply for powers to work the tramway undertaking if acquired, and also to raise the purchase money. When such powers are obtained the Corporation will be in a much stronger position to negotiate with the existing or any other company for the carrying on of the undertaking than they would otherwise be, or they would be able to work the undertaking themselves. Before the Council is called upon to determine whether they will purchase the undertaking in 1915, they will be supplied with a full report. At the meeting of the Town Council on September 9 the report was adopted.

## NEW AND PROSPECTIVE WORK.

ABERDEEN.—The Tramways Committee are considering a scheme for the erection of a new car shed, the total cost amounting to over £6,000. It is also proposed to extend the points out to Cranford Road so that cars can pass into the present shed through the new shed, and on to Cranford Road in order to avoid backing the cars out and in.

DARTFORD.—Balfour, Beatty and Co., Limited, have informed the Urban Council that as their lease of the Dartford Light Railways expires in less than eight years, they will not be able to finance the construction of the connecting line between Horns Cross and the termination of the Gravesend tramways at Swanscome, unless such line is to be taken over by the Council at the same time as the lease of the light railways falls in, and asking if the Council will agree to take over the connecting line.

DEWSBURY.—The Town Council have entered into an agreement with the National Electric Construction Company for the construction and leasing of tramways to Shaw Cross and Dewsbury Moor.

DUNDEE.—The Tramways Committee recommend an extension of the Blackness line to Glamis Road at a cost of £500.

HUDDERSFIELD.—The tramways will be extended to West Vale before the end of the year, thus giving a through connection with Halifax.

KEIGHLEY.—The period for the commencement and for the completion and opening for traffic of three tramways already authorised has been extended.

LEITH.—The Town Council have decided to seek legislative sanction to an extension of the tramways from the Seafield terminus to the boundary on Portobello Road. It is hoped that arrangements will be made with the Edinburgh Council to carry the extension right on to Portobello.

LLANDUDNO.—The Llandudno and Colwyn Bay Electric Railway, whose present Colwyn Bay terminus is in the centre of the town, have decided to continue their lines in a westward direction through the village of Old Colwyn for a distance of nearly two miles.

MUMBLES RAILWAY ELECTRIFICATION.—Mr. Tegetmeier, chairman of Swansea Tramways Company, and Mr. Little, the company's consulting engineer, paid a visit to Swansea on September 9 for the purpose of considering a scheme for the electrification of the Mumbles Railway, which is about five miles in length. The project would involve an expenditure of about £50,000. At present the trains occasionally carry 30,000 passengers a day.

SOUTHEND.—The Council proposes to spend £16,000 on laying double lines in Southchurch Road and Southchurch Beach Road.

SOUTH SHIELDS.—Harton Parish Council have stated that they approve of the proposed extension of the tramways to Harton village, and they suggest a further extension with a view to linking up with the Sunderland system.

WEMYSS.—The Wemyss District Tramways Company intend to double the line from Leven to Yallatown with as little delay as possible.

YORK.—The Council have referred back to the Tramways Committee for further consideration proposals to make three extensions under the Light Railways Act, including one along Hull Road at an estimated cost of £20,220. The committee had themselves deferred consideration of a proposed extension *vid* Leemar Road, estimated to cost £8,710, in order for the Streets Committee to take up the question of providing better access to the district.

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## WHEN REVENUE REACHES 1s. PER CAR MILE.

At the September meeting of the Burnley Town Council, Alderman Sharp Thornber drew attention to the monthly return of tramway traffic, and said it seemed they were earning less per car mile than last year. Councillor Heap, the chairman of the Tramways Committee, admitted that this was so, and Councillor Race stated that for the month of July the tramways earned 11.85d. per car mile, as against 13.10d. in the same month last year, adding that they had overdone the extra service of cars altogether. Councillor Irving: Has it not been argued by those who know that a very high receipt per car mile is not an advisable thing, and that beyond a certain figure the proper method of tramway work is to reduce the receipts per car mile? Councillor Heap admitted that the figures quoted by Councillor Race were quite correct, but still the Council would notice that the receipts for July were £1,000 more than in July of last year. Councillor Race: How much more are the expenses? Councillor Heap: Not near so much as the receipts. I think we show up very well in the returns. I am quite satisfied, along with the manager, that when we find traffic on the road it is a mistake not to try to pick it up. We do this, and I contend we have been fairly successful. The rule amongst tramway managers, when they get to a revenue of a shilling per car mile, is to put more cars on the track. The receipts are £1,000 up for July, even if they are less per car mile. We have carried 1,451,313 passengers, as against 1,277,764 in July of last year, and I think that is very satisfactory.

## MISCELLANEOUS NEWS AND NOTES.

**P.A.Y.E. Cars at Aberdeen.**—The P.A.Y.E. cars at Aberdeen have been running for 18 weeks on one of the routes, and show an increase in takings of £427.

**A Sheffield Anniversary.**—September 6 was the fourteenth anniversary of the inauguration of electric tramcars at Sheffield. The Corporation retains the first ticket issued.

**Omnibuses to be Ordered for Warrington.**—The Corporation tramways manager has been directed to advertise for the supply of two additional motor omnibuses similar in construction to those already in use.

**Tramway Burdens.**—An article in the *Morning Post* on the financial position of the L.C.C. tramways suggests an impartial inquiry into the subject of charging the undertaking with the cost of street improvements.

**Tramways for Ecuador.**—The concession just obtained by Lord Murray on behalf of Messrs. S. Pearson and Sons, Limited, includes schemes for tramways in Ecuador. The concession will run for a period of 40 years.

**Municipal Electrical Association.**—The Incorporated Municipal Electrical Association have published their proceedings for the year in a five shilling volume. All the valuable papers and reports read at the June convention at Kingston-on-Thames are included.

**Breakdown in Liverpool.**—At 4.30 on Sunday afternoon there was a breakdown at the Liverpool generating station of half an hour, and the whole of the tramway service was stopped. The trouble at the generating station also affected all places which used electric light.

**New Cars for Wigan.**—The Tramways Committee, desirous of purchasing new cars, are considering the design likely to be most suitable. A visit has been paid to Bolton to see a car which, with slight alteration and modification, might with advantage be adopted on the Wigan tramways.

**The Radius of a Curve at Montreal.**—A difficulty has arisen between the local tramway company and the municipality regarding the proposed curve of 600ft. around the site of the Cartier Monument in Park Avenue. The company insist that the curve will be dangerous and should be at least 1,200ft.

**Contract Tickets.**—The Southport Tramways Company have ceased to issue contract tickets on their system, thus following the example set last January on the Corporation tramways. The Tramways Committee have since found the takings in daily fares to be larger than the amounts paid for contracts.

**Concession to Manchester Tramwaymen.**—At the meeting of the Manchester Tramways Committee on September 9 it was decided to recommend the City Council to grant increases of 1s. per week to motormen, conductors, and trolley boys. It was stated that these increases would mean an additional expenditure of £6,000 per year.

**Skating to Save Time in a Store-Room.**—In the store-rooms of the new car depôt of the Union Street Railway Company, New Bedford, Mass., roller skates are worn by the stock-room attendants in traversing the extended floor area. The skates do not interfere with work on the ladders, and in taking inventories of stock they prove of great utility.

**New Pattern Seats at Doncaster and Sheffield.**—The saloon of a new car at Doncaster contains a new type of seat, the invention of Mr. E. S. Rayner, the tramways manager. It rests on legs and can be tipped back, thus facilitating the cleaning of the floor. The space underneath gives room for parcels. Mr. Fearnley, of Sheffield tramways, has adopted the seat for future use.

**The Rating of Tramways.**—In the judgment of the House of Lords on the Metropolitan tramway rating case, Lord Moulton accused the promoters of tramways of making improper use of the Light Railways Act, which was not intended to apply to them. In the discussion on the Bill Mr. Ritchie, then President of the Board of Trade, stated that its provisions were intended to apply to tramway undertakings.

**Vestibule Cars for Glasgow.**—At the Corporation tramway works new cars are being made at the rate of about ten each week in an order for one hundred vehicles. The department are also busily engaged placing vestibules on the whole stock. Already three hundred have been thus dealt with. There are now only some fifty of the old converted horse-drawn cars in the service, and they are used only at times of pressure.

**Route Indicators Required for Montreal Cars.**—A London visitor has advised the Montreal Tramways Company to give more information on the tramcars as to the routes being traversed. The value of more information signs would be in the direction of acquainting people of the various traffic points on the journey. Reversible signs, too, would prevent confusion as to the direction in which a car would be going.

**Steel Paving Blocks.**—In connection with track maintenance, the annual report on the Oldham tramways mentions that a number of steel paving blocks have been laid in Union Street for experimental purposes. The net working expenses of the Oldham undertaking per car mile were 6.084d. as compared with 4.528d. five years ago. Maintenance and equipment were more costly than a few years ago, being 2.11d. per car mile.

**The Dublin Strike Fiasco.**—The tramway service in Dublin is being well maintained in spite of the partial strike. Last week, however, the receipts were down by £3,405 as compared with the corresponding week of last year. To mark their sense of the action of the strikers many employers in Dublin have locked out those of their employees who are members of the Transport Workers' Union. Larkin, the strike leader, has again been remanded on the charge of sedition.

**Manchester's All-Night Cars.**—Although the Tramways Committee are not yet in a position to give a definite statement as to the newly-inaugurated all-night car service, disappointment is being expressed. About 2,500 people signed the petition in favour of the cars, but in the first fortnight of the experiment not more than a third have patronised them. The department will keep records of the returns for three months, when it will be possible to report definitely as to profit and loss.

**Curious Tramway Boycott.**—A consular report on Hong Kong describes a tramway boycott resulting from the decision of the company owning the Low Level Tramway to accept nothing but the legal tender in payment of fares. The boycott is said to have been due partly to interested action on the part of small bankers, money-changers and others who make large profits by the manipulation of exchange between Hong Kong currency and Chinese silver coins, and partly to political agitators.

**Peckham Trucks at Doncaster.**—During the first week in September the tramways department introduced in traffic a car of unusual length for Doncaster. It seats 74 passengers, the body being mounted on a Peckham radial truck, which passes round curves with greater ease than an ordinary single truck car, while the latter seats only 52 persons. Six other cars for which an order has been placed will have the Peckham pendulum truck. The makers of the trucks are the Brush Company, while the bodies are the work of the United Electric Car Company.

**The New Route at Birmingham.**—The Hagley Road route on the Birmingham tramways has been meeting with much support since its opening. With the arrival of the cars the omnibuses disappeared from Hagley Road, this being in accordance with the terms of the Watch Committee when the 'buses were licensed. The contract for the construction of the new line was secured by Mr. George Low, of Kidderminster, under the superintendence of the City Surveyor, who took advantage of the occasion to reconstruct the remainder of the paving of the carriage way for almost the entire length of the route. The length of the tramway is 2 miles 308 yards.

**Manchester Tramways and Football Traffic.**—Complaints are being made that the tramways department are not sufficiently enterprising on the occasion of football matches at Old Trafford. The officials declare that there is no justification for the complaints, and that so far as tramway service is concerned the Manchester United are treated better than any other football club in the country. Every Saturday 180 cars are requisitioned to take people to the United ground. The Corporation, however, are negotiating with Stretford Council for the laying of a tramway line along Talbot Road and Warwick Road. This would remove some of the congestion.

**First-Class Cars.**—Liverpool Council have agreed to run first-class cars on new routes. Though some members said these first-class cars did not pay, Alderman Smith, the chairman of the committee, insisted that first-class cars earned more money than the other cars.—Some luxurious first-class cars are to be put on the new Hagley route on the Birmingham tramways. The intention of the Birmingham Corporation to have two scales of fares is causing some criticism. There will be no cars exclusively first-class, but on the special cars a first-class ticket will admit to the inside of the car while the other passengers will have to ride on the top as in Liverpool.

**Heywood to Purchase Current in Bulk.**—At the August meeting of the Town Council it was arranged to purchase electricity in bulk from the Bury Corporation. It was urged that the committee should take into consideration the question of handing over the whole of the tramways to the Bury Corporation. Mr. J. Ashworth, chairman of the Electricity and Tramways Committee, reported that his committee had very carefully considered the question of taking electricity in bulk, and they had decided to accept the offer of Bury for a supply for ten years, with the option of a further five years. The result of this, in the opinion of the engineer, would be a saving of at least £1,388 per year.

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The taking of this bulk supply from Bury would necessitate an expenditure of about £12,000. The interest and sinking fund on this sum would be £750 a year, and even when this £750 had been paid the saving would be £1,388 per annum.

**Automatic Route Indicators.**—There are being introduced to the Stock Exchange the shares of a small company called the Route Recording Advertiser, Limited. The company are dealing in an automatic device for use in tramway cars and omnibuses to indicate the route. A street plan indicating all turnings and points of interest along the route moves automatically in accordance with the progress of the vehicle, about half a mile of the route being visible at a time. The company has a capital of £12,000 in five shilling shares, and the directors include Mr. Edward R. Soames, who is a director of the London Suburban Traction Company, which controls the Metropolitan Electric and London United Tramways and the M.E.T. Omnibuses.

**Hours of Labour and the Sickness Rate at Newcastle.**—Four hundred tramwaymen are stated to have now joined the union, and the branch president declares that they will soon be in a position to say that the man who did not join the Association would not be allowed to work on the Newcastle tramways system. He omitted to mention, however, that the Corporation will have something to say in reference to such a campaign of coercion. A deputation recently waited upon the Tramways Committee to demand lower hours and higher wages. It was pointed out that during the last year one-sixth of the men had been off over four weeks through sickness. The only preventive of that sickness was an eight-hour day. The Tramways Committee, according to the union secretary, have agreed that inspectors and timekeepers be chosen according to seniority and ability to do the work required of them.

## CONTRACTS AND ORDERS.

**Crompton and Co.** have obtained a contract from Doncaster Council for the supply of feeder panels.

**British Westinghouse Company** have received an order for 24 gear wheels for tramcars, at £2 13s. 0d. each, from Yarmouth Council.

**Wigan Council** have given the contract for painting the tramway standards to Messrs. Dawber and Cheetham.

**Stalybridge Joint Tramways and Electricity Board** have ordered a second motor wagon from Foden's, Limited, at £521

**British Insulated and Helsby Cables** have received from the Victorian Railways Department a contract for the supply of rail bonds.

**Dundee Council** have given contracts to Bruce, Peebles and Co., Limited, for converting machinery, at £1,500; and to the British Insulated and Helsby Cables, Limited, for cables.

**Hobart Council** are buying a six months' supply of tramway tickets in England. The estimated cost is £123, and it is declared that it would cost four times as much to have the tickets printed locally.

**Melbourne Municipality** have accepted the following tenders:—Spare armature for 500 kw. motor generator, British General Electric Company, £200; insulated copper cables, British Insulated and Helsby Cables, Limited, £1,361.

**Sheffield Council** have allotted contracts to Stuart and Moore for the installation of 50 patent telephonic street alarms, £4,007; Blasberg Engineering Company, supply and erection of two natural draught cooling towers, £8,770; Royce, Limited, supply and erection of three electric capstans, together with three fairleads, wire ropes, motors, etc., £1,128.

**Manchester Council** have awarded the following contracts:—Water-softening plant at Stuart Street station, Kennicott Water Softener Company, Limited; construction of new meter repair workshop at the Polygon Stores, Messrs. J. Gerrard and Sons, Limited; cables, W. T. Henley's Telegraph Works Company, Limited, Callender's Cable and Construction Company, Limited, and Messrs. Johnson and Phillips.

**Warrington Council** have accepted the following tenders:—Premier Accumulator Company, battery, booster, and switchboard plant for the tramways department; British Thomson-Houston Company, Limited, feeder panel, £84; Albion Clay Company, Limited, annual supply of conduits; Underfeed Stoker Company, Limited, patent underfeed stoker, with forced-draught fan and motor, £258; Veritys, Limited, motor generator, £52 10s.

**Glasgow Tramways Committee** have accepted the following tenders:—Sheet mica, Micanite and Insulators Company, Limited; armature binding wire, W. N. Brunton and Sons; scrap, zinc, lead-covered cable, brass turnings and borings, brass dust, copper and mica turnings, dry cells, J. Jackson and Co.; scrap lead, brass, copper, motor field coils, armature coils, P. and W. MacLellan, Limited; scrap vulcanised rubber cable, Ballardie, Holden and Co.; scrap rubber and motor tires, City Waste India-Rubber Company, scrap old bagging, George Cunningham; altering superheaters for Pinkston power station, Babcock and Wilcox, Limited.

**Petrol-Electric Tramcars for Hastings.**—W. A. Stevens, Limited, 26, Victoria Street, London, have received an order from the Hastings and District Tramways Company to fit several of their cars for petrol-electric propulsion as an experiment, with a view to establishing through running from Hastings to Bexhill. If the vehicles are found to run satisfactorily twenty such cars will be required. Readers will remember that the use of the surface contact system on two miles of the Hastings sea front has been forbidden by the Board of Trade, whose licence expired on September 6. In order to enable the test of the petrol-electric cars to be satisfactorily carried out, the company have applied to the Board for an extension of the licence, and this application has been supported by the Town Council. Three petrol-electric cars by Messrs. Stevens are now running on the East London lines of the London County Council.

## PERSONAL.

**Mr. C. H. Chester,** traffic superintendent of the Salford Corporation tramways, has obtained an appointment in New Zealand.

**Mr. C. C. Hutchinson,** barrister, has delivered his award to the Bacup Town Council regarding the differences between Bacup and Rawtenstall over the tramways lease.

**Mr. H. Parkes,** depôt superintendent, Burton tramways, has been recommended by the Tramways Committee for an increase of £5 on his salary of £140 per annum.

**Messrs. Merz and McLellan,** of London, are acting as consulting engineers to Perth Council (Western Australia) in connection with the scheme for erecting a new power house.

**Mr. S. Boys,** supplies manager to the Sheffield branch of Siemens Bros.' Dynamo Works, has been appointed to take charge of the London business of the Edison and Swan Electric Light Company.

**Mr. N. P. Perez,** who has for several years been connected with the Electric Construction Company, Wolverhampton, has resigned on appointment as chief engineer and designer to Crompton and Co., Chelmsford.

**Messrs. Wilson and Winstone,** of the New Zealand Portland Cement Company, Whangarie, are journeying to America and Europe for the purpose of purchasing machinery for the generation of hydro-electric power at Waitoa Falls.

**Mr. H. G. Matthews,** who is referred to by a local journal as the popular manager of the Quebec Railway, Light, and Power Company, has reported that the company are making record profits, and that this year will prove to be the most successful on record.

**Mr. Stanley Dudman,** late manager of the Dartford tramways for Balfour, Beatty and Co., Limited, has been appointed to take charge of the firm's new tramways between Ripley and Nottingham. Mr. D. N. R. Bruce, late of Stroud (Glos.), has become manager at Dartford.

**Mr. A. J. Pembery,** of the india-rubber department of Siemens Bros., Limited, Woolwich, on the completion of fifty years' service, has been presented by the firm with a purse of gold, and by the staff and employees with a gold watch and chain, and a gold-mounted umbrella for Mrs. Pembery.

**Mr. C. Lucken,** who for five years has been engineer-in-charge to Siemens Bros. and Co., Limited (Tantalum Lamp Works), Dalston, has accepted a similar appointment with the Hong Kong and Shanghai Banking Corporation, Gracechurch Street. Mr. Lucken was presented with a marble clock by his late colleagues.

**Mr. E. P. Grove** will arrive at Melbourne about the middle of September to supervise the works in connection with the electrification of the suburban railways on behalf of Mr. C. H. Merz Mr. Stone, the electrical engineer to the Victorian Railways Department, will not take charge until the electrification has been completed.

**Mr. E. Sockington,** who was the recipient of a silver cigarette case from the passengers taking part in the first of the six-day road motor tours arranged by the Bath Electric Tramways Company, Limited, is the traffic superintendent of that company, and not of the local branch of the Bristol Tramways and Carriage Company.

**Mr. H. F. Friederichs,** electrical engineer to West Hartlepool Council, has had his salary increased, without application for an increment, from £450 to £500, in recognition of the great amount of work which had fallen upon him in connection with the scheme for utilising waste heat from the local blast furnaces. It was stated by Alderman Macfarlane on September 2 that the waste heat plant had borne the whole burden of the electricity supply since August 2.

**Mr. Alex. Hannan,** of the general office staff, Wallasey Corporation tramways, after 12½ years' service, is leaving to take up an important position in Chile, and the occasion has been marked by three presentations. Mr. Hannan received from the general manager (Colonel R. R. Greene, V.D.) a solid leather morocco lined attaché case; a massive silver cigarette case from the office staff; and a travelling trunk from the members of the Tramways and Electricity Departments' Employees' Social Club, of which club Mr. Hannan has acted as hon. secretary. The presentations were made by the general manager in the presence of representative gatherings of the staff, and from the reception accorded to him there can be no doubt that Mr. Hannan carries with him the goodwill of all connected with the undertaking.

**Mr. J. Shaw McCormick,** who for a period of four years was assistant manager of the Cavehill Tramways Company, has died at Belfast. When the Belfast Corporation took over the line Mr. McCormick was retained as manager of the new Bellevue Gardens at Glengormley.

## FINANCIAL REPORTS AND MEETINGS.

**Manila Electric Railroad and Lighting Corporation.**—A dividend of 1¾ per cent. ($1.75 per share) for the quarter ending September 30 has been declared on the common capital stock.

**Hurst Nelson and Company.**—The accounts for the year ended July, 1913, will permit of the arrears of preference dividend being paid up on November 11, 1913, together with dividend for the half-year ending on that date.

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**Gateshead Tramways.**—An interim dividend at the rate of 5 per cent. per annum for the half-year ended June 30 has been declared on the ordinary shares. The interim dividends on the 5 per cent. and 6 per cent. preference shares will also be paid.

**The British Electrical Federation.**—The traffic statement for the week ended September 5, 1913, shows that the receipts from tramways and railways amounted to £41,013, as compared with £40,719 in the corresponding week last year, and from omnibuses £11,417, as compared with £831, making a total of £52,430, as compared with £41,550. The tramway and railway route mileage was 429.82, as compared with 431.52. The Federation now have 507 omnibuses, an increase of 415 within the year. Upon such of the services as were working, both last year and this year, the receipts show an increase of £1,850 upon the week.

**Oldham Tramways.**—The accounts of the Oldham Corporation tramways for the year ended March 31 last show a net balance of £4,549, which compares very favourably with the situation last year when there was a deficiency of £2,413. The total revenue was £108,000, and £15,458 has been placed to sinking fund. Over 21 million passengers were carried, and the average traffic revenue per car mile was 12.645d. The average fare per passenger came to 1.16d. There are 92 cars on the system. The gross capital expenditure has been £442,000, and £111,417 has been applied from the sinking fund in the reduction of debt. During the year the committee prohibited the display on the cars of alcoholic liquor advertisements.

**United Electric Car Company.**—The report of the United Electric Car Company, Limited, Preston, for the year ended June 30, states that after paying debenture interest amounting to £1,783, and charging £5,950 for depreciation, the profit for the year is £10,809, to which is added £4,249, brought from last year, making a total of £15,058. After deducting £3,000 for preference dividend for the six months ended December 31, 1912, there is an available balance of £12,058. The directors recommend its allocation as follows:—£3,000 to pay the preference dividend for the half-year ended June 30 last; £7,500 to pay a dividend of 5 per cent. on the ordinary shares for the year; and £1,558 to carry forward. Mr. Prestwick and Mr. Kerr, the two retiring directors, offer themselves for re-election.

**Darwen Tramways.**—The accounts of the Darwen Corporation tramways for the year ended March 31 last show that the traffic receipts on the Darwen section were £13,501. Just upon 2½ millions of passengers were carried. The mileage run was 219,000, giving an average income per mile run of 14.7078d. The expenditure totalled £9,387 (equal to 10.2713d. per mile run), which sum includes an allowance of £960 for depreciation. The gross profit of over four thousand pounds was carried to net revenue account. The net profit for the year was £558. On the Hoddlesden section the receipts were £1,805 and the expenditure £1,578, the latter figure including £150 placed to depreciation account. The gross profit on working was £316, but the net revenue account shows a net loss for the year of £452. Just over 209,000 passengers were carried. The mileage run was 33,355, giving an average income per mile of £1 1½d.

**Blackpool's Record Receipts per Car Mile.**—The annual report of Mr. Charles Furness, general manager, Blackpool tramways, states that the year's receipts were £74,166, and the gross profit £34,484. Compared with the previous year the receipts increased by £8,826, gross profit by £9,378, net surplus by £8,278, passengers by 1,083,491, and mileage by 107,286. Working expenses showed a decrease of £552. The receipts increased on all routes, the largest being on the circular tour, which amounted to £4,857. Postcards, advertising, and circular route realised £221, the profit being £77. The average receipts per car mile reached the record figure of 16.93d. The maximum number of cars run was 72, and the minimum 15, the average number of cars in daily use being 32. Permanent way expenditure out of revenue account amounted to £2,203, and £6,087 out of permanent way renewal fund. Mr. Furness points out that the expenditure on the permanent way is an increasing factor, and therefore it was desirable that a sum of not less than £10,000 be allocated annually to the fund for at least the next five years. Since the adoption of car meters and the keeping of a complete record, a considerable saving had been effected in the current consumption per car mile, which was 1.33.

**A Portsmouth View of Municipal Tramway Deficits.**—The accounts of the Portsmouth Tramways Committee for the year ended March 31 show that a balance of £10,057 has been allocated as follows:—£4,000 to the Borough Fund, £3,000 to the Fire and Insurance Fund, £350 for depreciation, and £3,306 for carrying forward. At the recent meeting of the Council Councillor Groves expressed pleasure that the cars had been "speeded up" to the speed allowed by the Board of Trade. There was more likelihood of the halfpenny fares coming by speeding up the cars than by any other means. They wanted to make it worth the while of busy people to use the cars. Councillor Taylor remarked that as the gross profits of the tramways were £57,000 at least £10,000 instead of only £4,000 should be handed over for the relief of the rates. During a discussion upon the advisability of halfpenny fares, Councillor Pink said the time was not opportune to take any risk by revising fares. At Glasgow, where they had halfpenny fares, there were eleven non-paying routes. Where halfpenny fares were made to pay was in the busiest portions. In Portsmouth the cars were only full during meal hours and at night. Out of 94 Corporation systems he pointed out that 54 were failures owing to the fact that they tried to give too much for the money.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 67 of the principal undertakings of the United Kingdom, including the lines owned by the British Electrical Federation, for the week ended September 6 amounted to £252,766, or £17,454 more than in the corresponding week last year, while the track mileage was 2,735, or 50 more than for the corresponding week. The receipts were at the rate of £92 8s. 4d. per track mile, an increase of £4 15s. 7d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

September 12, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, Sept. 12. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 72 15 0 | 73 7 6 | 78 10 0 |
| ,, ,, (three months) .. .. | 72 12 6 | 72 17 5 | 78 17 6 |
| Electrolytic Copper—bars or ingots .. | 77 5 0 | 76 5 0 | 81 15 0 |
| Aluminium—bars or ingots .. .. | 86 10 0 | 86 0 0 | 79 0 0 |

## COAL MARKET.

September 12, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, Sept. 12. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 | 25 0 | 22 9 | 22 0 |
| Best Seconds.. .. .. | 23 9 | 24 0 | 22 0 | 21 3 |
| Ordinary Drys .. .. | 21 0 | 21 0 | 20 6 | 19 3 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | 19 6 | 19 3 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 18 0 | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 | 20 6 | 17 3 | 18 0 |
| Best Seconds .. .. | 19 3 | 19 6 | 16 6 | 17 3 |
| Ordinary Drys .. .. | 16 6 | 16 6 | 15 0 | 15 3 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 14 0 | 15 0 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 12 6 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 | 11 9 | 14 0 | 11 3 |
| Best Seconds .. .. | 13 6 | 13 6 | 12 6 | 10 0 |
| Smalls .. .. .. | 8 6 | 8 6 | 9 0 | 4 6 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Sept. 9 | £53,467 | £56,592 | 36 | £1,994,178 | +£178,340 |
| Auckland..... (14 days) | Aug. 29 | 18,602 | 19,543 | 9 | 41,610 | + 1,150 |
| Ballarat and Bendigo | July 27 | 791 | 764 | 17 | 15,124 | — 166 |
| Brazilian St. Rly. Mlrs | July | 41,756 | 49,056 | 52 | 545,185 | + 24,928 |
| Brazilian Traction..... | Aug. 30 | 82,056 | 92,059 | 35 | 3,104,403 | + 447,491 |
| Brisbane ..... | August | 27,080 | 29,970 | 34 | 207,178 | + 48,744 |
| British Columbia .....$ | June | 498,308 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacroze .. | August | 41,677 | 44,462 | 8 | 89,684 | + 6,009 |
| Calcutta.....Rs. | Sept. 6 | 62,844 | 71,278 | 36 | 22,94,634 | + 1,17,755 |
| Cape Town ..... | July | 10,875 | 11,417 | 30 | 85,900 | + 5,182 |
| Carthagena & Herreria | August | 2,151 | 2,192 | 34 | 23,317 | + 6,983 |
| East India ..... | August | 1,922 | 2,005 | 4 | 2,005 | + 83 |
| Kalgoorlie..... | July | 2,993 | 2,796 | 30 | 20,022 | + 1,628 |
| La Plata..... | August | 3,601 | 4,641 | 8 | 40,989 | + 9,040 |
| Lima..... | July | 32,259 | 34,410 | 30 | 232,637 | + 10,261 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,481 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Aug. 31 | 26,683 | 28,084 | 34 | 430,205 | + 31,655 |
| Melbourne ..... | July | | 59,000 | 30 | 439,500 | ... |
| Mexico .....$ | July | 570,619 | 610,602 | 30 | 3,876,142 | + 34,102 |
| Montevideo..... | August | 26 249 | 28,829 | 34 | 316,431 | + 26,324 |
| Para ..... | Sept. 7 | 3,807 | 3,890 | 40 | 160,865 | + 1,659 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 28 | 53,887 | + 5,582 |
| Port Elizabeth..... | July | 3,126 | 3,256 | 30 | 25 127 | + 6,662 |
| Shanghai .....$ | Sept 3 | 21,435 | 25,000 | 35 | 759,652 | + 81,831 |
| Singapore .....$ | Sept. 6 | 10,702 | 14,459 | 36 | 427,829 | + 54,619 |
| Toronto .....$ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....$ | June | 300,402 | 321,027 | 26 | 1,972,374 | + 163,671 |

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Sept. 3 | £1,903 | £1,896 | + £7 | 14 | £24,408 | + £1,549 |
| Ayr Corporation ..... | ,, 6 | 285 | 342 | + 57 | 16 | 8,220 | + 891 |
| Bath Electric ..... | ,, 3 | 1,033 | 1,238 | + 185 | 36 | 35,201 | + 2,662 |
| Birkenhead Corp. ..... | ,, 7 | 1,151 | 1,281 | + 130 | 23 | 29,992 | + 3,011 |
| Birmingham Corp. ..... | ,, 6 | 10,755 | 11,708 | + 953 | 23 | 261,824 | + 18,803 |
| Blackburn Corporation | ,, 3 | 1,202 | 1,476 | + 274 | 23 | 30,863 | + 2,832 |
| Blackpool & Fleetwood | ,, 6 | 1,789 | 2,233 | + 444 | 10 | 19,939 | + 3,094 |
| Blackpool Corporation | ,, 4 | 3,351 | 4,296 | + 945 | 22 | 55,003 | + 7,818 |
| Bolton Corporation ..... | ,, 7 | 2,695 | 3,212 | + 527 | 23 | 63,587 | + 3,501 |
| Bournemouth Corp. ..... | ,, 10 | 2,366 | 2,817 | + 451 | 23 | 54,164 | + 6,314 |
| Bradford Corporation... | ,, 6 | 5,542 | 5,892 | + 350 | 23 | 138,113 | + 8,191 |
| Brighton Corporation... | ,, 7 | 1,265 | 1,378 | + 113 | 23 | 28,050 | + 1,501 |
| Bristol ..... | ,, 5 | 8,006 | 9,202 | + 1,196 | 35 | 236,852 | + 40,032 |
| British Elec. Fed. ..... | ,, 5 | 41,550 | 52,430* | ... | ... | ... | ... |
| Burnley Corporation ... | ,, 6 | 1,584 | 1,688 | + 104 | 23 | 39,531 | + 4,995 |
| Burton-on-Trent Corp. | ,, 7 | 269 | 298 | + 29 | 23 | 6,774 | + 237 |
| Bury Corporation..... | ,, 7 | 1,270 | 1,424 | + 154 | 27 | 31,671 | + 1,159 |
| Cardiff Corporation..... | Aug. 16 | 2,468 | 2,830 | + 362 | 20 | 55,119 | + 5,993 |
| Chatham and District.. | Sept. 4 | 930 | 992 | + 62 | 35 | 32,519 | + 1,712 |
| Chesterfield Corp. ..... | ,, 4 | 226 | 253 | + 27 | 22 | 5,895 | + 744 |
| Colne & Trawden..... | ,, 6 | 270 | 305 | + 35 | 36 | 9,872 | + 673 |
| Cork Electric..... | ,, 4 | 510 | 558 | + 48 | 35 | 17,694 | + 259 |
| Croydon Corporation ... | Aug. 29 | 1,743 | 1,663 | — 80 | 21 | 38,635 | — 4,310 |
| Darlington Corporation | Sept. 6 | 230 | 245 | + 15 | 23 | 5 781 | + 544 |
| Derby Corporation ..... | Aug. 30 | 933 | 1,070 | + 137 | 22 | 21,908 | + 2,358 |
| Dover Corporation ..... | Sept. 6 | 287 | 299 | + 12 | 23 | 6,205 | — 17 |
| Dublin & Lucan ..... | ,, 5 | 176 | 158 | — 18 | 9½ | 1,810 | + 186 |
| Dublin United ..... | ,, 5 | 6.383 | 2,917 | — 3,405 | 35 | 210,805 | + 1,785 |
| Dundee City ..... | ,, 3 | 1,809 | 1,425 | + 116 | 16 | 21,408 | + 1,836 |
| East Ham Corporation | ,, 6 | 1,085 | 973 | — 112 | 23 | 23 455 | — 1,120 |
| Exeter Corporation ..... | ,, 5 | 366 | 379 | + 13 | 23 | 8,218 | + 325 |
| Gearless Motor 'Buses. | ,, 6 | ... | 537 | ... | 22 | 10,208 | ... |
| Glasgow Corporation ... | ,, 6 | 19.249 | 20,458 | + 1,210 | 14 | 276,748 | + 19,580 |
| Glossop(U.Elec.Supply) | ,, 6 | 123 | 134 | + 11 | 36 | 4,646 | + 520 |
| Halifax Corporation ... | ,, 2 | 2,123 | 2,228 | + 105 | 22 | 48 816 | + 836 |
| Hastings & District..... | ,, 4 | 1,422 | 1,500 | + 78 | 36 | 37,881 | + 2,745 |
| Huddersfield Corp. ..... | ,, 6 | 2,151 | 2,093 | — 58 | 23 | 49,461 | + 2,960 |
| Hull Corporation ..... | ,, 6 | 3,031 | 3,054 | + 3 | 23 | 70,025 | + 3,213 |
| Ilford U.D.C. ..... | ,, 6 | 450 | 439 | — 11 | 23 | 10,570 | — 1,625 |
| Ilkeston Corporation ... | ,, 10 | 128 | 142 | + 14 | 24 | 3,182 | + 567 |
| Ipswich Corporation ... | ,, 6 | 519 | 527 | + 8 | 23 | 11,247 | + 228 |
| Isle of Thanet l..... | ,, 6 | 1,553 | 1,593 | + 40 | 49 | 38,065 | + 1,566 |
| Kilmarnock Corp. ..... | ,, 6 | 166 | 169 | + 3 | 16 | 3,015 | + 222 |
| Lanarkshire ..... | ,, 4 | 1 794 | 1,839 | + 45 | 35 | 58,801 | + 7,244 |
| Lancashire United ..... | ,, 3 | 1,542 | 1,879 | + 337 | 35 | 53,685 | + 5,761 |
| Leeds City ..... | ,, 6 | 7,909 | 8,196 | + 287 | 23 | 191,444 | + 12,550 |
| Leicester Corporation... | ,, 6 | 2,541 | 2,835 | + 294 | 36 | 100,011 | + 9,198 |
| Leith Corporation ..... | ,, 6 | 680 | 728 | + 48 | 16 | 12,196 | + 333 |
| Liverpool Corporation.. | ,, 6 | 12,328 | 13,170 | + 842 | 35½ | 459,991 | + 33,917 |
| Llandudno &Colwyn B. | ,, 5 | 770 | 804 | + 34 | 40 | 14,355 | + 1 229 |
| London County Council | ,, 3 | 40.345 | 40.341 | — 96 | 22 | 934,860 | — 20,910 |
| London Gnl. Omnibus.. | ,, 6 | 57,424 | 54,401 | — 3,023 | 36 | 2,228,789 | + 451.427 |
| London United ..... | ,, 5 | 6.494 | 6,090 | — 404 | 36 | 226.701 | + 1,052 |
| Lowestoft Corporation | ,, 6 | 345 | 403 | + 58 | 43 | 10,409 | + 405 |
| Maidstone Corporation | Aug. 14 | 205 | 212 | + 7 | 21 | 4,147 | + 204 |
| Manchester Corp..... | Sept. 6 | 17.244 | 17,988 | + 794 | 23 | 404,732 | + 19,852 |
| Nelson Corporation..... | Aug. 30 | 191 | 237 | + 40 | 22 | 4.757 | + 313 |
| N'castle-on-Tyne Corp. | Sept. 6 | 4,451 | 4,764 | + 317 | 23 | 110,147 | + 9,372 |
| Newport (Mon.) Corp.... | ,, 6 | 743 | 820 | + 77 | 23 | 17.609 | + 1,232 |
| New St. Helens & Dist... | ,, 3 | 826 | 935 | + 109 | 10 | 9,046 | + 1.162 |
| NorthamptonCorp ..... | ,, 5 | 532 | 626 | + 94 | 22 | 13.434 | + 586 |
| Nottingham Corp. ..... | ,, 4 | 3,128* | 3,354 | + 226 | 22½ | 75,224 | + 2.582 |
| Oldham Corporation ... | ,, 7 | 1,764 | 1,982 | + 218 | 24 | 53,033 | + 3,211 |
| Portsmouth Corp..... | ,, 6 | 2,515 | 2,628 | + 113 | 23 | 56,351 | + 2.246 |
| Preston Corporation ... | ,, 3 | 899 | 931 | + 32 | 23 | 20,619 | + 1,078 |
| Provincial ..... | ,, 6 | 2,278 | 2,392 | + 114 | 49 | 93,411 | + 6,240 |
| Reading Corporation .. | ,, 4 | 673 | 740 | + 67 | 22 | 15.873 | + 960 |
| Rochdale Corporation | ,, 6 | 1,608 | 1,760 | + 152 | 23 | 37,625 | + 1 303 |
| Rotherham Corp..... | ,, 10 | 765 | 1,027 | + 262 | 23 | 23,128 | + 1 303 |
| Salford Corporation ... | ,, 8 | 5,181 | 5,604 | + 423 | 23 | 121.665 | + 4 396 |
| Sheffield Corporation... | ,, 7 | 6,684 | 7,234 | + 550 | 24 | 173,423 | + 13.746 |
| Southampton Corp..... | ,, 3 | 1,410 | 1,490 | + 80 | 22 | 30,617 | + 1,244 |
| Southend-on-Sea Corp. | ,, 3 | 1,116 | 1,483 | + 320 | 23 | 24,483 | + 3.617 |
| South Shields Corp..... | Aug. 30 | 669 | 829 | + 160 | 22 | 16,362 | + 2,257 |
| Sunderland Corp..... | Sept. 7 | 1.295 | 1,564 | + 273 | 23 | 34,388 | + 3.889 |
| Sunderland District ... | ,, 3 | 520 | 569 | + 49 | 44 | 24,191 | + 4.427 |
| Swindon Corporation ... | ,, 3 | 170 | 178 | + 8 | 22 | 3,792 | + 276 |
| Trys.(M.E.T.)Omn. Co. | ,, 6 | ... | 7,395 | ... | 32 | 134,403 | ... |
| TynesideTrys.&Tmrds | ,, 3 | 512 | 534 | + 22 | 10 | 5,358 | + 438 |
| Wallasey Corporation | ,, 6 | 1,187 | 1,335 | + 148 | 22 | 29 683 | + 2,603 |
| Walsall Corporation ... | ,, 6 | 577 | 608 | + 31 | 36 | 22,243 | + 1,534 |
| Walthamstow U.D.C.... | ,, 6 | 711 | 717 | + 6 | 23 | 17,655 | — 296 |
| Warrington Corp ..... | Aug. 28 | 431 | 428 | — 3 | 21 | 9,649 | + 331 |
| West Ham Corporation | Sept. 4 | 2,630 | 2 638 | + 8 | 23 | 61,848 | + 1,457 |
| Wigan Corporation .... | ,, 4 | 1,374 | 1,446 | + 122 | 22 | 33,281 | + 3,482 |
| Wolverhampton Corp | ,, 10 | 978 | 1,049 | + 71 | 24 | 25,746 | + 1,411 |
| Yorkshire (W. Riding | ,, 7 | 1,331 | 1,416 | + 85 | 36 | 52,100 | + 5,732 |

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Sept. 6 | £4,474 | £4,296 | — £178 | 36 | £174 4'9 | + 210,632 |
| City and South London | ,, 6 | 2.722 | 2,650 | — 72 | 36 | 101,613 | — 9,509 |
| Liverpool Overhead..... | ,, 7 | 1,682 | 1.761 | + 79 | 36 | 61,895 | + 4,863 |
| London Electric..... | ,, 6 | 11,665 | 12.055 | + 390 | 36 | 489 930 | + 4,185 |
| Mersey ..... | ,, 6 | 2.182 | 2,206 | + 24 | 36 | 79,999 | + 5,008 |
| Metropolitan ..... | ,, 7 | 16,310 | 17.556 | + 1.246 | 36 | 611,952 | + 14,401 |
| Metropolitan District... | ,, 6 | 11,787 | 12,180 | + 393 | 36 | 465,577 | + 18,319 |

* Upon such of the services as were working both last year and this year the receipts show an increase of £1,850 upon the week.

| Paid. | TRAMWAY AND OMNIBUS SHARE LIST. | On Week | Quotations. September 12. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 74 — 77 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¼ — 4⅜ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅜ — 4⅝ |
| 100 | Do. 4% Deb. Stk. Red. ..... | .. | 92 — 94 |
| 100 | Do. 4½% Deb. Stk. Red. ..... | ... | 96 — 98 |
| 100 | Do. 5% Deb. Stk. Red.... ..... | + ½ | 98½ —100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref ..... | ... | 1⅛ — 1⅜ |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 75 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref .. | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — ½ | 95 — 96 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | + ⅛ | 7⅛ — 7⅝ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | + 1 | 99 —102 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¾ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —103 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 96 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 1 | 125 —128 |
| 100 | Do. Pref. Ord. Stock ..... | ... | 112 —115 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | — 2 | 93 — 95 xd |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 86 — 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... | + 1 | 48 — 51 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 11 — 12½ |
| 100 | Do. Deferred Ord. Stock ..... | ... | 4½ — 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | + 1 | 92 — 95 |
| 100 | Do. 4½% Second Debenture Stock, Red | + 1 | 76 — 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | + 1½ | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ — 6¾ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. ..... | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ⅞ — 1⅛ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5⅛ — 5⅜ |
| 100 | Do. 4% Debenture Stock Red, 1965 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. .. | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | — 1/16 | — 10¾ |
| 10 | Do. do. 6% Pref. ..... | ... | — 12 |
| 100 | Do. do. "A" Red. ..... | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79¾ |
| 10 | Gateshead & Dist. Trys. Co., Ord. ..... | ... | 8½ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | ⅜ — ⅝ |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | 1/32 — 3/32 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ... ..... | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. ..... | ... | 6¼ — 7¼ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 80 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2½ — 2⅝ |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | ⅝ — 3/32 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | 1/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. ..... | ... | 1 1/32 — 1 1/32 |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 — 1¼ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — ⅜ |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 96½ — 98½ |
| 100 | Do. do. 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 61 — 65 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 4¾ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 111 —114 |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1/32 — 1 1/32 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red. .. | ... | 84 — 88 |
| 100 | Do. do. 5% Deb. Stock, Red. .. | ... | 90 — 93 |
| $100 | Mexico Tramways Co., Common Stock ..... | — 1 | 98 —100 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 89½ — 91½ |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | ... | 93½ — 95½ |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) .. | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. ..... | — 1/32 | 1/32 — 1 1/32 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6¾ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6 — 6⅛ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. ..... | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | ⅞ — 1⅛ |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim., Ord. ..... | ... | 1/32 — 3/32 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5 %.. | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | + ¼ | 101¾ —102¾ |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | + ½ | 96 — 97 |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | ... | 102 —104 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8½ — 9¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 — 89 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅛ — ¼ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 68 — 73 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | + ⅛ | 87 — 89 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 89½ — 92½ |
| 5 | United Elec. Tramways of Monte Video, Ord. ..... | ... | 4⅝ — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | — 2½ | 98½ —100½ xd |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅛ — ⅝ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 3⅛ — 3⅜ |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. ..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 15. ] LONDON, SATURDAY, SEPTEMBER 20, 1913. [ Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### ABERDEEN CORPORATION TRAMWAYS.

The Town Council of Aberdeen are prepared to receive tenders for :—

Six Complete Electrical Equipments for Double-Deck Cars.

Specifications may be had from the undersigned on application at the Tramways Office, Municipal Buildings, Aberdeen.

Tenders, endorsed "Tender for Complete Electrical Equipments," to be lodged at the Tramways Office, Municipal Buildings, not later than 12 o'clock noon on Wednesday, October 1, 1913.

The Town Council do not bind themselves to accept the lowest or any tender.

R. STUART PILCHER,
General Manager.

Corporation Tramways Office, Aberdeen,
September 17, 1913.

### LEICESTER CORPORATION TRAMWAYS.

UNIFORM CLOTHING.

The Committee invite tenders for the supply of about 500 Suits for Inspectors, Motormen, Conductors, etc., for delivery in April next.

Samples may be seen on application to, and tender forms obtained from, the Manager, 20 and 22, Humberstone Gate, Leicester.

Sealed tenders, endorsed "Tender for Suits," addressed "Chairman, Tramways Committee, Humberstone Gate, Leicester," must be delivered not later than Saturday, October 4, 1913.

The Committee do not bind themselves to accept the lowest or any tender.

A. F. LUCAS,
Manager.

September 13, 1913.

### LEICESTER CORPORATION TRAMWAYS.

TICKETS.

The Committee invite tenders for the supply of Passenger Tickets, with advertising rights, for 12 months, commencing January 1, 1914.

Specifications and conditions and forms of tender may be obtained on application at the Tramway Offices, Humberstone Gate, Leicester.

Tenders must be addressed to "Chairman, Tramways Committee, Humberstone Gate, Leicester," and must be returned not later than Saturday, October 4, 1913.

A. F LUCAS,
Manager.

September 13, 1913.

### SALFORD CORPORATION.

ELECTRICITY DEPARTMENT.

Tenders required by noon, September 29, 1913, for supply, delivery, and erection of Rotary Converters. Specification, etc., from the Borough Electrical Engineer, Electricity Works, Frederick Road, Pendleton, on receipt of deposit of two guineas.

### KEIGHLEY CORPORATION.

ELECTRICITY DEPARTMENT.

6,600 VOLTS THREE-PHASE ALTERNATING CURRENT TRANSMISSION LINE.

Tenders are invited for an Overhead Transmission Line in duplicate, suitable for conveying electrical energy at 6,600 volts, three-phase alternating current, frequency 50 cycles per second.

The length of the line will be slightly over two miles.

The line must be constructed in accordance with the latest model regulations of the Board of Trade for electric lines placed above ground.

Full particulars, and copies of the specification and form of tender, may be obtained on payment of a deposit of £2 2s., which will be returned on receipt of a *bonâ-fide* tender.

Extra copies of the specification may also be obtained at 10s. per copy, which will not be returned.

A route plan, showing pole positions and general lay out, can also be had at 10s. per plan, which will not be returned.

The latest date for receiving tenders will be the 1st October, 1913.

It is imperative that the work must be completed by the end of November, 1913.

Applications for tenders, etc., to be made in writing to the undersigned.

HARRY WEBBER, A.M.I.E.E.,
Borough Electrical Engineer and Tramways Manager.

Electricity Offices and Works,
Coney Lane, Keighley.

### LIVERPOOL TRAMWAYS CORPORATION.

CONTRACT FOR THE SUPPLY OF TICKETS.

The Tramways and Electric Power and Lighting Committee are prepared to receive tenders for three years' supply from the 1st January, 1914, of Passengers', etc., Tickets. The approximate quantity used per annum will be 150,000,000.

Copies of specification, general conditions, and form of tender may be obtained on written application to the General Manager, Corporation Tramways, 24, Hatton Garden, Liverpool, where standard samples of the tickets may be viewed any day (except Saturday and Sunday) between the hours of 9 a.m. and 5 p.m.

The Corporation do not bind themselves to accept the lowest or any tender.

Tenders must be posted in the official envelope provided, duly sealed, addressed to the "Town Clerk, Municipal Buildings, Liverpool," and endorsed "Tender for Tickets," so as to be received not later than 10 a.m. on Thursday, September 25, 1913.

EDWARD R. PICKMERE,
Town Clerk.

### WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

CONTRACT "V."—LOW-TENSION CABLE.

The above Council invites tenders for the supply and delivery of Low-Tension Feeder Cable.

Specifications and forms of tender may be obtained from Mr. G. R. Spurr, Electrical and Tramways Engineer, Electricity Works, Priory Avenue, Walthamstow, by depositing the sum of one pound, which will be returned on receipt of a *bonâ-fide* tender, and to the successful contractor on the completion of the contract.

Sealed tenders, upon the forms supplied, endorsed "Tender for Cable," must be delivered by post only to the undersigned, not later than 12 o'clock noon on Wednesday, October 8, 1913.

The Council do not bind themselves to accept the lowest or any tender.

C. SYDNEY WATSON.
Clerk to the Council.

Town Hall, Walthamstow,
September 17, 1913.

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## DUNDEE TOWN COUNCIL.

The Dundee Town Council are prepared to receive tenders for—

(1) The Construction of Tramways in Blackness Road, and

(2) The supply of 170 tons of Steel Tramway Rails and of Manganese Steel Points and Crossings and Steel Tiebars.

Plans may be seen and specifications, schedules of quantities, and forms of offer obtained at the Office of the Subscriber on depositing with him two guineas, which deposit will be returned on a *bonâ-fide* tender being lodged with Wm. H. Blyth Martin, Town Clerk, City Chambers, Dundee, not later than 10 o'clock a.m. on September 29, 1913.

The Town Council do not bind themselves to accept the lowest or any tender.

JAS. THOMSON,
City Engineer.

Municipal Offices,
91, Commercial Street, Dundee,
September 12, 1913.

## ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria, Australia, is prepared to receive new tenders for the

20,000-volt High-Tension Switchgear,
Low-Tension Switchgear and Accessories

for the power station and sub-stations to be constructed in connection with the electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from the Agent-General for Victoria on or after Monday, September 22, 1913. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to the consulting engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification is £5 5s. for the first copy and £2 2s. each for any further copies. Sums paid for copies will be refunded on receipt of a *bonâ-fide* tender for the whole of the works included in the specification.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways—Tenders for Switchgear and Accessories," are to be addressed to the Agent-General and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 o'clock (noon) on Monday, October 13, 1913.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

(*Continued on page* 263.)

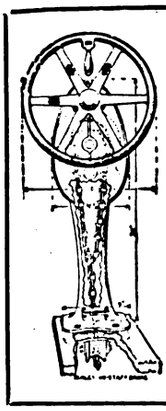
**TRAMWAY SUPPLIES, Ltd.,**
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.
Robert KEARSLEY & Co., Ltd.
RIPON, England.

**MILLARS' TIMBER AND TRADING CO., LTD.**
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK. M.J.
Telegrams: "JARRAH, LONDON." Telephone: 368 LONDON WALL.

**SIMPLEX CONDUITS, Ltd.**
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
500 page Catalogue sent free on request.

FOR
SPECIAL
**CAR VARNISH**
SEND TO
**PINCHIN JOHNSON & CO., Ltd.,**
MINERVA HOUSE,
BEVIS MARKS, LONDON, E.C.



**THE BRITISH ACKLEY BRAKE AND SUPPLY CO., Ltd.,**
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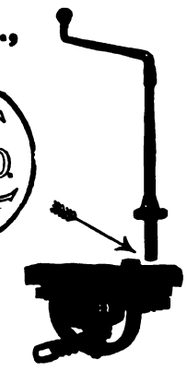

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THE
# Tramway AND Railway World

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SATURDAY, SEPTEMBER 20, 1913.

THE "OCEAN"
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## URBAN PASSENGER TRANSPORT.

A number of circumstances combine to render of exceptional interest the paper on urban passenger transport which Mr. J. B. Hamilton is to read at Sheffield on Thursday next. Within the past few months the Leeds manager and his colleague in the neighbouring city of Bradford have had to answer the question of what is likely to happen to the electric tramway system in view of the progress made by petrol vehicles. That this advance now affects the provinces as well as the metropolis is shown by the number of municipalities that have introduced the omnibus in the dual capacity of serving localities hitherto without the means of public locomotion and of acting as a feeder to the tramways. With the close of the municipal tramway year on May 31 next, some enlightenment upon the vexed question of total working costs calculated on the same basis as for tramways may be looked for. Another question likely to call for a decision will be that of road maintenance in places where the vehicles have been placed in service without any attempt having been made to provide suitable surfaces. This latter consideration will largely affect the popularity of the outside seats, for even on the smooth roads of central London it is something of a penance to undertake more than a quarter-of-an-hour's ride without the intervention of the padded seats of the interior of the vehicle. A number of provincial tramway companies have also invested in petrol motors, while the extended operations of more than one London combination now serve to place at the command of any municipality motor transport services without financial risk to the authority. It is somewhat surprising that advantage is not being more largely taken of this form of enterprise. Probably the reason is to be found in the fact that it is only during the past year that the scheme has been introduced. The question to which we have alluded was put to Mr. Hamilton by the Bristol Corporation in connection with the report he was asked, in conjunction with Mr. Snell, to place before them as to the proposal to obtain Parliamentary powers to enable them to work the tramways if the system is acquired from the Tramway Company in May, 1915, should the authority and the ratepayers decide in favour of that course. The two consultants were asked to take into consideration the chance of any alteration or improvement in electric or any other form of traction which would replace the present system. Their reply was that the Corporation possess a very valuable option, which it would be advantageous for them to exercise on May 1, 1915, in the absence of any important radical changes. In another column of this issue will be found the answer of Mr. Spencer to the question of the future of the tramways which he has put in his annual report. The Bradford manager's answer is less guarded, but it is none the less correct, and we would add that the omnibus will have to accomplish the task—seemingly impossible from a financial point of view—of using pneumatic tyres before there can be any talk of superseding the tramcar. Even then the supersession would only be for light traffic, while the petrol vehicle would still remain the more dangerous to life and limb. The use which the Bristol Tramways Company have made of the internal combustion engine, in order to provide new services and feeders, has not only increased the value of the tramways undertaking itself, but has provided corporations with a model system of combined tramways and omnibuses to which they would do well to direct their attention. To the London companies now seeking to open up new business in the provinces the report which Mr. Charles Challenger, the Bristol manager, prepared, showing the admirable manner in which the recent Royal Agricultural Show traffic was dealt with by tramcar and motor vehicle, should prove valuable.

## TRADE UNION TYRANNY.

There are some aspects of the strikes engineered by agitators that are seldom taken into consideration. The case, for instance, of the old members: Is it fair to these men to urge them to stand by their employers when by such loyalty they lose all the benefits of the union to which they have subscribed for many years? And why should they be loyal to an employer who is, oftener than not, an impersonal body—a board, a council, the management—whereas their fellow workers are individually known to them, and loyalty to "mates" is one of the characteristics of the British labouring man? The younger men, on the other hand, if they have recently joined, may get strike pay amounting to more than their contributions to the union; so they do not stand to lose much, and are tempted to exercise that fighting spirit, which is another of their characteristics. If by legislation, or by any other means, they could possibly recover what they have paid to the society, so that they would suffer no pecuniary loss by not coming out, the ranks of the strikers would be thinned to such an extent that the results of any cessation of work would be innocuous; indeed, the older men would probably form pickets to induce their younger brethren to go back to work. Blacklegs, knobsticks, or whatever they are called, should have their pockets protected as well as their persons. This contention is supported by the fact that individuals, if taken separately, will admit readily that they do not want to strike, but, if ordered to do so, they will have to come out, as they cannot afford to do otherwise. Unless some indemnity fund can be estab-

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lished to make good any pecuniary losses to men who wish to be loyal to their employers, the "executive" will continue to rule with a rod of iron. There is another great difficulty in the way of would-be loyal men, which is that, when a strike occurs, many men besides the unionists are thrown out of work, and that, while the members of unions get strike pay, the outsiders get nothing, although they attend every day during the crisis and are idle against their will. Naturally they will be inclined to say, "We would be better off if we did join," and join they do accordingly. Considering the attitude taken by the public, as voiced by the Press in other cases, it is rather difficult to understand why the typical dispute with the London omnibusmen—although it is only over a badge—should have enlisted so much sympathy. Surely to enforce discipline is not "foolish." The British worker is a man of few words, and can be influenced by the sheer force of a fluent verbosity to which he cannot find language to reply or to refute on the spot; therefore he seemingly acquiesces in statements which he knows to be altogether wrong. Many of them detest this tyranny exercised by wind-bags, whom they despise at heart—but what can they do under present circumstances? It is all very well to talk about the degradation of slavery to their unions, the stupidity of quarrelling with their bread and butter, and the nobility of being true to their salt—but how are they to make good those savings which they have accumulated with so much toil, and those benefits to which they look forward? Of course, if the unemployment fund be made to apply to men on strike, there will be no occasion for anyone to work at all. Moreover, as it now appears plainly, there are other matters to be considered besides the badge question. The principle at issue from the first has really been the recognition of the union executive, for which they fight tooth and nail, and for ability to force all the workers into their organisation by hook or by crook; if they did not get this their occupation would be gone. To bring this about it is necessary that a non-unionist should be recognised at sight, in order that his life, and that of his dependants, may be made a burden to them by all and sundry members of unions. If these be not the reasons for the order to wear the badge, what are they? Surely if a man's uniform be provided for him it is only common sense that no departures from uniformity should be allowed except by consent. It would certainly appear as if the employers had made a mistake in giving way at all, although the matter seems so paltry. One paramount decision in all such cases is the point at which a stand should be made. It is evident that the sooner the contending parties can narrow the issues to some definite point and take their stand there, the sooner would there be a possibility of arriving at a solution satisfactory to both parties—and to the third party, who is apt to be forgotten in the noise of the strife—the public.

## THE FUTURE OF BRADFORD TRAMWAYS.

No Fear of Supersession by Existing Petrol-Propelled Vehicles.

Some interesting additions have been made by Mr. C. J. Spencer, general manager of the Bradford Corporation tramways, to his annual report on the working of the undertaking to March 31 last, as issued in booklet form. The financial details of this the fifteenth yearly report were noted in the issue of this journal for July 10 last. "The operating difficulties of the Bradford tramways system are of a rather extraordinary character," Mr. Spencer says. "From the commercial point of view the heavy operating expenses, due to steep gradients and constant wear and tear, are unavoidable, as is also the disadvantage of a very low density of population per route mile." Having regard to these difficulties the Corporation may congratulate themselves not only on having a good service of cars, but that in addition to meeting all dues and demands they are able to contribute annually a substantial amount to the relief of rates, pay good wages, and possess a reserve and renewals fund amounting to about £60,000. Only two fatal accidents have occurred during the fifteen years. Taken as a whole, Bradford may be said to be one of the "best trammed cities in the country."

Adverting to "what is likely to happen to the tramways system inside the next fifteen to twenty years," in which time the bulk of the financial liability of the Corporation, as far as the tramways are concerned, will have been paid off, Mr. Spencer states that it has been predicted by some who are qualified to speak, that the day is not far distant when the tramcar will be superseded by some better vehicle. The petrol-propelled vehicle has undoubtedly made great strides, but unless it develops a good deal more than seems at present possible he does not think it would supersede the tram in Bradford. There seems no reason to anticipate any radical change in transit methods for some years to come.

On the Bradford railless trolley car installation, one mile 460 yards in length, there is a loss shown on the face of the accounts. Whether this is a real loss or not it is impossible to say. The vehicles are of the pioneer type, and are to be replaced by more modern cars.

The outstanding feature of the accounts is the very gratifying increase in total revenue, notwithstanding the heavy decrease in fares for early morning traffic. The total revenue from all sources (excluding bank interest, rents, etc.), amounted to £299,102, compared with £289,335 for the corresponding period of last year. The expenditure (excluding interest, sinking fund, etc.), amounted to £200,552, compared with £180,135 in the previous year. During the year 62,005,076 passengers (175 times the population) were carried, compared with 56,352,281 the previous year. There are to be considerable extensions at the Thornbury depôt. A building for the accommodation of engineering, machinery, and blacksmiths' shop is now in hand at an estimated cost of £5,871. During the year the parcels department handled 716,157 parcels, compared with 625,914 in the preceding year.

"The Tramways Department has arrived," the report says, "at what may be termed the half-way house, inasmuch as the loans for tramway purposes were granted generally for thirty years, and, as will be seen from a perusal of the accounts of the City Treasurer, nearly half the capital borrowed for tramway purposes has been repaid."

## BELFAST TRAMWAYMEN'S PROFIT BONUSES.

Surcharge made upon Three Members of the Council.

Indignation has been created in Belfast by the action of an auditor of the Local Government Board of Ireland in having surcharged three members of the Corporation, who, by their signatures, authorised the payment in May, 1912, of the sum of £2,800 to the tramway employees as a bonus out of the profits of the undertaking.

The general manager (Mr. Andrew Nance), in his annual report, which came before the Corporation on May 1, 1912, pointed out that a new duty had been imposed upon him by the resolution passed by the Council on March 1, 1912, which read as follows:—"That the general manager be instructed that, after estimating at the commencement of each financial year the probable amount of profits, he is to fix, subject to the approval of the Committee and Council, the wages and salaries for the then ensuing year, the said wages being made up of (a) a fixed sum in each case, and (b) a certain proportion of profits, but taking care that the entire sum paid to each employee will not exceed such amount as would be payable, on purely commercial principles, in the interest of the ratepayers."

In accordance with that resolution, Mr. Nance having estimated the probable amount of profits, fixed, subject to the approval of the Committee and the Council, the wages and salaries for the ensuing year. Each member of the tramway staff, during his term of service, was to receive weekly or monthly, as the case might be, the fixed wages and salaries allotted to his post or position by the resolution of the Council dated March 1, 1912; and, in addition, those members of the existing staff who were continuously in the service of the department and paid by it from April 1, 1911, to March 31, 1912, were to have the sum of £2,800 equally divided among them, being a certain proportion of the estimated profits of the ensuing year, each payment of such equal share to be properly and individually charged to the various persons receiving the same as wages or salaries, receivable by them during the ensuing financial year.

Mr. Nance was of opinion that profit-sharing would give the men a stronger interest in their work, increase *esprit de corps*, and promote unity between the Corporation and their tramway employees. It is said that the effect of the surcharge will be that practically every worker in the service of the tramways in receipt of a weekly wage will have his allowance reduced by an average of about 1s. 9d. a week, which will be regarded as a real grievance. The Corporation hold that the bonuses are a perfectly legitimate charge, and that a similar scheme is, in fact, pursued in some Government departments. Before adopting the plan the Corporation obtained the opinion of Mr. Stephen Renan, K.C., an eminent member of the Irish Bar, as to the legality of the step, and on his advice the Corporation felt that they were entitled to regard the step as perfectly legal. The *Belfast News Letter* states that the surcharge will doubtless be the subject of legal proceedings.

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# THE MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

More than seventy Corporations will be officially represented at the Conference of the Municipal Tramways Association which will be held at Sheffield on Wednesday, Thursday, and Friday of next week, under the presidency of Mr. A. R. Fearnley. The list of delegates is as follows :—

ABERDEEN.—Councillor J. A. Smith, chairman; Mr. R. S. Pilcher, manager.

ACCRINGTON.—Councillor T. Morley; Mr. H. Pilling, manager.

ASHTON-UNDER-LYNE.—Councillor R. S. Oldham, chairman; Mr. E. Holt, manager.

AYR.—Mr. P. S. Ferguson, chairman; Mr. W. Grant, manager.

BELFAST.—Alderman J. S. Finnigan, vice-chairman; Alderman J. Tyrrell, J.P.; Mr. A. A. Blackburn, engineer.

BEXLEY U.D.C.—Councillor Reid, vice-chairman; Mr. H. P. Stokes, manager.

BIRKENHEAD.—Councillor H. Hansall, chairman; Mr. C. Clarke, manager.

BIRMINGHAM.—Alderman Bowater; Councillor Barrow; Mr. A. Baker, manager.

BLACKBURN.—Councillor C. Higham, vice-chairman; Mr. J. H. Cowell, manager.

BLACKPOOL.—Councillor Milton Wilde, J.P., Mayor; Alderman Brodie, J.P., chairman; Councillor Holt, vice-chairman; Mr. C. Furness, manager.

BOLTON.—Alderman J. Miles, chairman; Councillor H. Hill; Mr. J. Barnard, manager.

BOURNEMOUTH.—Councillor A. Davis, chairman; Councillor R. F. Godfrey, vice-chairman; Mr. I. Bulfin, manager.

BRADFORD.—Councillor E. Priestley, chairman; Councillor S. C. T. Neumann, vice-chairman; Mr. C. J. Spencer, manager; Mr. T. Stirk, traffic superintendent; Mr. J. W. Falkingham; Mr. J. W. Dawson, assistant engineer.

BRIGHTON.—Alderman Wilson, chairman; Mr. W. Marsh, manager.

BURNLEY.—Councillor Heap, chairman; Councillor Irving, vice-chairman; Mr. H. Mozley, manager.

BURTON-ON-TRENT.—Mr. A. B. Slater, manager.

BURY.—Alderman Collinge, chairman; Councillor Hargreaves, vice-chairman; Mr. W. Clough, manager.

CARDIFF.—Alderman Sir J. W. Courtis, Kt., J.P.; Councillor A. J. Stone, vice-chairman; Mr. A. Ellis, manager.

CHESTER.—Alderman Jones; Mr. J. Gardner.

CHESTERFIELD.—Alderman E. Shentall, chairman; Councillor J. E. Clayton, vice-chairman; Mr. R. L. Acland, manager.

COLCHESTER.—Mr. R. C. Bullough, manager.

COVENTRY.—Councillor M. K. Pridmore, chairman; Councillor S. Bettman, vice-chairman; Mr. T. R. Whitehead, manager.

CROYDON.—Alderman J. Trumble, J.P., Deputy Mayor; Mr. T. B. Goodyer, manager.

DARWEN.—Mr. F. J. S. Hosken, manager.

DERBY.—Councillor J. Dean, J.P., vice-chairman; Mr. F. Harding, manager.

DUNDEE.—Councillor G. A. Johnstone; Councillor W. H. Buist; Mr. P. Fisher, manager.

EAST HAM.—Councillor W. T. Howlett, chairman; Alderman C. Northfield, J.P., Mayor; Mr. W. C. Ullmann, manager.

EDINBURGH.—Councillor J. Harrison, convener; Mr. A. H. Campbell, burgh engineer.

ERITH.—Mr. A. Coveney, manager.

GLASGOW.—Bailie Kirkland; Bailie Alston; Mr. J. Ferguson, chief engineer; Mr. L. Mackinnon, traffic superintendent.

GLOUCESTER.—Mr. L. Johnstone, manager

HALIFAX.—Councillor C. F. Spencer, chairman; Councillor A. Fawcett, vice-chairman, Councillor A. Seed; Mr. J. D. Caird, traffic manager; Mr. J. W. Galloway, engineer.

HUDDERSFIELD.—Alderman J. H. Aston, J.P., chairman; Alderman J. Taylor, vice-chairman; Mr. R. H. Wilkinson, manager.

HULL.—Alderman E. Robson, J.P., chairman; Councillor J. Hargreaves, J.P., vice-chairman; Mr. W. J. McCombe, manager; Mr. J. Wilkinson, electrical engineer.

ILFORD U.D.C.—Mr. L. E. Harvey, manager.

ILKESTON.—Alderman Shaw, chairman; Councillor W. Tatham, vice-chairman; Mr. L. C. F. Bellamy, manager.

LANCASTER.—Councillor Wilkinson; Mr. G. C. Milnes, manager.

LEEDS.—Alderman Brown; Alderman Tetley; Mr. J. B. Hamilton, manager.

LEICESTER.—Alderman S. Flint, J.P., chairman; Alderman G. Banton, J.P., vice-chairman; Mr. A. F. Lucas, manager; Mr. T. R. Smith, electrical engineer.

LEITH.—Judge Hall; Mr. F. A. Fitzpayne, manager.

LIVERPOOL.—Alderman F. Smith, chairman; Major R. J. Clarke, vice-chairman; Mr. C. W. Mallins, manager.

LONDON C.C.—Mr. W. J. Squires; Mr. A. L. C. Fell, chief officer.

LOWESTOFT.—Mr. H. H. Saunders, manager.

MANCHESTER.—Alderman Bowes, chairman; Councillor A. W. Chapman, vice-chairman; Mr. J. M. McElroy, manager.

MAIDSTONE.—Councillor Lyle; Mr. A. T. Lambert, manager.

NEWCASTLE-ON-TYNE.—Councillor J. H. Rodgers, chairman; Councillor R. Mayne, vice-chairman.

NEWPORT.—Mr. John Moxon, chairman; Mr. N. J. Young, manager; Mr. A. Nichols Moore, electrical engineer.

NORTHAMPTON.—Chairman; Vice-Chairman; Mr. J. Gottschalk, manager.

NOTTINGHAM.—Chairman; Vice-Chairman; Mr. J. Aldworth, manager.

OLDHAM.—Councillor F. G. Isherwood, J.P., chairman; Alderman F. Elliott, vice-chairman; Mr. J. W. Dugdale, manager.

PERTH.—Councillor J. Moncrief, chairman; Mr. W. S. Snell, manager.

PLYMOUTH.—Mr. C. R. Everson.

PRESTON.—Councillor Crompton; Councillor Ormrod; Mr. J. F. Simpson, manager.

RAWTENSTALL.—Alderman Coupe, chairman; Mr. C. L. E. Stewart, manager.

READING.—Alderman C. G. Field, Mayor; Mr. G. F. Craven, manager.

ROCHDALE.—Councillor J. P. Fielden, chairman; Alderman Wm. Cunliffe, Mayor; Mr. G. Webster, manager.

ROTHERHAM.—Mr. Ed. Cross, manager.

SALFORD.—Alderman H. Linsley, chairman; Councillor Littler; Mr. G. W. Holford, manager.

SHEFFIELD.—Alderman Sir Wm. Clegg, chairman; Councillor A. T. Bescoby, vice-chairman; Alderman J. Knowles, chairman Engineer Committee; Mr. A. R. Fearnley, manager; Mr. H. E. Yerbury, electrical engineer; Mr. A. Handford, traffic superintendent.

SOUTHPORT.—Councillor T. S. Richardson, chairman; Councillor J. Champion, vice-chairman; Mr. T. J. Kendrew, manager.

SOUTH SHIELDS.—Councillor J. W. Henderson, Mayor; Mr. W. T. Robson, manager.

STALYBRIDGE.—Alderman R. Wood, deputy chairman; Mr. F. Schofield, commercial manager; Mr. R. Blackmore, chief engineer.

STOCKPORT.—Alderman C. Sharples, chairman; Alderman W. E. Hamnett, vice-chairman; Mr. A. T. Eardley, manager.

SUNDERLAND.—Councillor G. New, J.P., chairman; Councillor W. Walker, vice-chairman; Mr. A. R. Dawson, manager.

WALLASEY.—Councillor J. Farley, chairman; Lieut.-Col. R. R. Greene, manager.

WALSALL.—Alderman J. Cope, chairman; Alderman J. Williams, vice-chairman; Mr. R. L. Horsfield, manager.

WALTHAMSTOW U.D.C.—Councillor E. Samuels, chairman; Mr. W. Murray, manager.

WARRINGTON.—Alderman Smethurst, chairman; Councillor Wilkinson; Mr. J. Telfer, manager.

WEST HAM.—Alderman W. G. Spittle, J.P., Mayor; Alderman H. W. Littler, chairman; Mr. J. S. D. Moffett, manager.

WEST HARTLEPOOL.—Mr. C. Burgess.

WOLVERHAMPTON.—Alderman S. Craddock, vice chairman; Mr. W. A. Luntley, manager.

YORK.—Mr. J. W. Hame, manager.

# MISCELLANEOUS NEWS AND NOTES.

**A Bradford Experiment.**—Further experiments are to be made on the Bradford tramways of a three-halfpenny fare.

**Transfers at Nottingham.**—The innovation of three-halfpenny transfer tickets has been started by the Nottingham Tramways Committee.

**Aberdeen Extension.**—The City Council have agreed to apply for a Provisional Order for the extension of the tramway system, and for further borrowing powers to the extent of £50,000.

**Proposal to Purchase Greenock Tramways.**—On September 16 the Town Council deferred for a month the discussion of a motion to give notice to the Greenock and Port-Glasgow Tramway Company that the Corporation has decided to exercise the option to terminate the lease of the undertaking on May 15, 1914.

**The Trouble at Dublin.**—Beyond one or two attacks on cars by roughs the tramway strike trouble has ended, but something like 20,000 workpeople have been locked out by other employers who are bent on destroying the influence of the agitator Larkin. The fund for rewarding the loyal tramwaymen has nearly reached a total of £1,000.

**Brill Trucks for New Cars at Aberdeen.**—The Tramways Committee have adopted a report received from Mr. R. S. Pilcher, general manager, requesting that six additional top-covered cars be provided to cope with the increased traffic in the city. Authority was given to order Brill trucks, and to receive tenders for the electrical equipment.

**Weymouth Public Transit Problem.**—Mr. Geo. Conaty, formerly manager of the City of Birmingham Tramway Company, and now a consulting engineer, offered his services to the Weymouth Council to advise in the matter of cheap traction facilities by either railless trolley traction or by motor omnibus. Alderman Pye moved that the offer should be considered by the Motor Omnibus Committee, who had the question of a motor service in hand; but an amendment was adopted for the letter to remain on the table.

**Stirling Electrification Scheme.**—The Town Council on September 16 received a letter from Mr. G. Balfour, of Messrs. Balfour, Beatty, and Co., regarding his proposals for the electrification of the tramways. He said that he was prepared to pay the sum of £28,642 for the electricity undertaking to cover the unreedemed debt on the undertaking, an additional sum of £2,250 to refund the Council the difference in accumulated debit balances, accumulated up to the year 1908, and the credit balances carried to reserve since that date; and, in addition, a sum in cash of £2,000, making a total of £32,892. Mr. Balfour also promised a reduction in the charges for current. The matter was adjourned for consideration.

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**Manchester All-Night Service.**—Although hardly more than a third of the people who signed the memorial in favour of the all-night hourly service have made use of the cars, Alderman Bowes, chairman of the Tramways Committee, states that they intend to go on with the facilities for three months, keeping an accurate account of the cost and use. The committee did not expect a profit, but did not want a serious loss.

**South Yorkshire Tramway Scheme.**—Wath, Bolton, Wombwell and Thurncoe Councils are combining in the consideration of a joint municipal tramway scheme, with possibilities of extension in the direction of Mexborough and Barnsley. Mr. J. L. Hawksworth, clerk to the Bolton-upon-Dearne Council, has been appointed clerk to the joint authorities. In connection with the scheme, Messrs. Bury and Walkers have been appointed solicitors. A well-known Westminster engineer is acting as adviser to the authorities.

**Sheffield Tramways and the University.**—A deputation representing the Sheffield University have waited on the Tramways Committee to urge the claims of the University for a grant in aid of the scheme for the extension of the University buildings. The Tramways Committee have decided that it is for the public benefit that the application should be complied with, and they recommended the Council to make a grant of £1,000 per annum for a period of ten years, as empowered under the local Tramways Act. The City Council have agreed to the proposal.

**The Colour of the Car.**—Manchester is discussing the æsthetic tramcar. One paper alluded to the "unique inappropriateness" of the colour of the local cars, and now a correspondent writes:—"There are no better or brighter cars within fifty miles of Manchester. Compare our cars with those of Liverpool and many other of our Lancashire towns, and I am sure Manchester cars will give them all the go-bye. What is the objection to having bright-looking cars in our streets? Your critic compares the colour of Salford cars, and praises the 'quietness' of it; but I notice that they are changing the colour to one very similar to ours, and I am pleased to see it, for chocolate brown does not suit dingy streets, particularly on a wet day."

**Electric Welding.**—The Sheffield Corporation are adopting electrical welding in connection with its tramways. The method is the "Tudorweld," carried out by the Tudor Accumulator Company, of Westminster. The weld is being applied to rails which are worn at the joints, but which are otherwise in a good condition. The worn piece at each joint is cut out, and a fresh piece of rail is fitted to fill up the gap completely, and then all the parts are electrically welded together. The welding of rails by other processes has been carried on in Sheffield during the last three years, and although many of the welds were done during the hot summer of two years ago, and there are now some thousands of welded joints in use, there has not been a single breakage. In Liverpool and Glasgow also, it is stated, the process has proved very successful.

**Edinburgh Tramway and Omnibus Proposals.**—The City Council on September 16 received a report by a sub-committee on a motion to consider and report as to the routes to be adopted for motor 'bus service, and as to the arrangements to be made for the purchase of the necessary 'buses. A sub-committee was appointed to have a consultation with the Tramway Company with regard to the running of 'buses in the city. The burgh engineer was directed to prepare a report on a motion in favour of obtaining a Provisional Order for the extension of the tramways to Redford Barracks and the Dreghorn district. Arising out of a motion by Councillor Deas to consider and report as to the expediency of making tramway extensions beyond the city boundaries, an instruction was given the Town Clerk to bring his 1905 report regarding extensions beyond the city bounds up to date. The sub-committee was instructed to consult with the Tramway Company also on the subject of extension to Corstorphine.

## CONTRACTS AND ORDERS.

**Walsall Council** have accepted the tender of Messrs. Letts and Airston for extending the tramway offices

**Bexley Council** have accepted the offer of the Hart Accumulator Company, Limited, for renewing and enlarging the battery, at £500.

**J. W. Courtenay, Limited,** have been re-appointed sole advertising contractors to the Liverpool Corporation tramways for a long term of years.

**The Canadian Westinghouse Company** have received a contract for the supply of three generators for the Winnipeg municipal power house.

**An Electric Tower Wagon.**—Ilford Council have decided to purchase a motor tower wagon, at £689, from the Edison Accumulators, Limited.

**Ilford Council** have placed an order with the British Insulated and Helsby Cables for a mile of tramway trolley wire at 9 9-16d. per lb., less 2½ per cent. discount.

**Lincoln Council** have allotted contracts as appended:—Willans and Robinson, Limited, turbo-alternator; Howden Boiler Company, water-tube boiler; Geo. Robson and Co., coal-elevating and conveying plant; Thornhill Bros., extensions to the electricity works.

**Burnley Council** have placed a contract with the British Insulated and Helsby Cables, Limited, for the supply of 1,000 yards of lead-covered cable, and with the British Thomson-Houston Company for the supply of electric motors required by the Electricity Committee up to March next.

**Bexley Council** have agreed to a recommendation made by the tramways engineer for fifteen of the cars to be equipped with trucks of the type selected by him, at a cost of £48 per car. £20 of this sum has been sanctioned by the Board of Trade as being necessary for the fitment of electro-mechanical track brakes. It is estimated that the new trucks will effect a saving in cost of maintenance of trucks (this item at present costs £120 per annum), a saving of at least 10 per cent. in current consumption on the cars, a saving in maintenance of cars and permanent way in consequence of the easier running of the cars, and the scrap value of old material superseded. The question of placing top covers on six cars at a cost of £115 per car was deferred for three months. Councillor White said that it was important that there should be some protection for passengers in the winter, and moved that the engineer report on the advisability of fixing removable awnings. The chairman said that the engineer informed him that the police would not allow that, and the amendment was not pressed.

## PERSONAL.

**Sir John Courtis,** chairman of Cardiff Tramways Committee, spent the vacation in America.

**Mr. C. W. Shepherd,** manager of the Edinburgh tramways, recently underwent an operation for appendicitis at the Isle of Man, while on holiday. The operation was in every way successful, and Mr. Shepherd is progressing favourably.

**Mr. W. N. Brooks,** traffic superintendent, Brighton Corporation tramways, on his own application supported by the Tramways Committee, has had his salary increased to £169 per annum. He was appointed in March, 1909, and has since received two increases.

**Mr. W. German,** who for fourteen years has been connected with the engineering and traffic departments of Blackpool Corporation tramways, has been presented with a gold watch by his colleagues on the occasion of his departure to fill another local appointment. In making the presentation Mr. Charles Furness, the borough electrical and tramways manager, said he was glad to learn that Mr. German had improved his position. It was on such occasions as applying for new positions that character counted, and he was happy and proud to say that the men of the Blackpool tramways department had a very high standard of character.

**Mr. Leonard Johnston,** general manager and electrical engineer, Gloucester Corporation tramways, was on September 12 appointed tramways manager at Southampton out of 38 applicants, and will enter upon the appointment about the middle of October. The salary is £400 per annum. A sub-committee had also interviewed selected candidates at Stockport, Ilford, Walsall, and Hull, and when the recommendation came before the Council an amendment was proposed in favour of directing the committee to bring up three names for selection. This was lost. Mr. Johnston was called before the Council and answered a number of questions. Mr. Johnston has been at Gloucester since January, 1909, and under his management considerable improvements have been made in the service, while the financial position has also improved. He was formerly connected with the Blackburn tramways.

**Mr. R. L. Horsfield,** tramways manager to Walsall Council, was recommended by the Tramways Committee for an increase in his salary from £400 to £500 by half-yearly increments of £25. The General Purposes Committee disapproved of the recommendation, but at the September meeting of the Corporation Ald. J. Cope, chairman of the Tramways Committee, moved an amendment that his committee's recommendation should be approved, and observed that the manager had earned their confidence during the ten years he had been with them. He was well able to carry on the work at a great profit, and a greater profit in the future. Alderman Cope pointed to the heavy work Mr. Horsfield had done, having had charge of all departments, and said there had been a very great increase in the amount of work since the tramways manager's connection with the Corporation. Alderman Williams, in supporting, said had not Mr. Horsfield withdrawn his name as a candidate for the position of tramway manager for Southampton he would no doubt have been elected. Councillor Talbot remarked that but for the services of highly-technical and highly-skilled men labour would be nowhere, and he asked that consideration should be given to the recommendation. The amendment was lost by 12 votes to 15, the report being approved.

**Mr. James Farley,** whose death was announced on September 13, at the age of 36, at New York, was a specialist in breaking down street car strikes. He was originally a tramway man in Philadelphia, and, it is said, came out on strike. The strike failed, and Farley's wife died from the hardships she had to endure. From that day Farley devoted his life to fighting the trade unions. At first he offered only his own services, but he soon saw the commercial possibilities of strike-breaking. He organised a staff of men who were at the same time skilled workmen and were armed with revolvers, and paid them a retainer of 4s. a day. It is stated that he has left a fortune of £100,000.

## FINANCIAL REPORTS AND MEETINGS.

**Winnipeg Electric Railway Company.**—A quarterly dividend of 3 per cent. is announced, payable October 1.

**British Electric Transformer.**—An interim dividend at the rate of 6 per cent. per annum has been paid on the ordinary shares.

**Lima Light, Power, and Tramways Company.**—The board announce a dividend of 1 per cent. for the second quarter of the current year.

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**Dick, Kerr and Co.**—A final dividend of 3 per cent. has been declared on the six per cent. cumulative preference shares, payable October 1.

**Gateshead and District Tramways Company.**—The directors announce an interim dividend at the rate of 5 per cent. per annum on the ordinary shares for the half-year.

**The British Electrical Federation.**—The traffic statement for the week ended September 12, 1913, shows that the receipts from tramways and railways amounted to £42,199, as compared with £38,596 in the corresponding week last year, and from omnibuses £13,221, as compared with £697, making a total of £55,420, as compared with £39,293. The tramway and railway route mileage was 429.82, as compared with 431.52. The Federation now have 511 omnibuses, an increase of 419 within the year. Upon such of the services as were working, both last year and this year, the receipts show an increase of £4,225 upon the week.

**Ayr Tramways.**—In his annual report on the working of the Ayr Corporation electric tramways the general manager (Mr. W. Grant) states that the total revenue for the year amounted to £16,295, being the highest in the history of the department. The passengers numbered 3,880,850, an increase of 3.62 per cent. Halfpenny fares represented 55.33 per cent. of the passengers and 28.63 per cent. of the receipts, penny fares 17.86 and 18.49, and twopenny fares 12.29 and 25.46 respectively. The net balance amounted to £3,378, of which £2,040 was carried to the depreciation and renewals fund and £1,337 transferred to the burgh general assessments. The depreciation and renewals fund amounts to £9,918, while there is also a reserve fund of £5,000.

**Aberdeen Tramways and the Common Good.**—Aberdeen tramways department pay an annual rent of £20 per mile to the Common Good as rent for the use of the streets on a portion of the lines, constructed by the company prior to 1888 and extending to 8.86 miles, the annual payment being £177. The surplus revenue, after meeting working expenses, renewals, depreciation, and all other charges, is, in terms of the Tramways Acts, meantime carried to a reserve account to provide for deficiencies and contingencies. The Council, however, have resolved to make application to Parliament for power in any year to appropriate and apply a sum not exceeding one-third of the free surplus revenue for that year to the Common Good, or towards the reduction of the rates, or in carrying out such improvements as the Council may determine.

**United Electric Car Company.**—The annual meeting was held at Preston on September 17. Mr. Robert L. Barningham, the chairman, said the past year's working was not so satisfactory as that of the previous year. The net profit on that occasion was the best since 1907, viz., £15,267. The past year had certainly not been a boom year in the demand for tramcars, and in the circumstances the directors considered the net profits of £10,800 satisfactory. Such had been their anxiety to secure orders that they had often to take work at prices which, although showing a small margin of profit, did not really cover the extra prices of materials. The keen competition had mainly affected them for foreign work, and had come chiefly from American and Continental firms. The order books and prospects were slightly better than twelve months ago. They should take the earliest opportunity to build up their general reserve to provide for the loss in the realisation of the Hadley and Trafford Park works. The report was adopted, and it was decided to pay a dividend of 5 per cent. on the ordinary shares, and to carry forward £1,558. Messrs. R. H. Prestwich (Manchester) and J. Kerr were re-elected directors.

*(Continued from page 258)*


## CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF SINGLE-PHASE TRANSFORMERS.

Tenders are invited for the supply of six 60 k.v.a. and one 30 k.v.a. Single-Phase Transformers.

Copies of specification, conditions of tender and of contract and form of tender can be obtained on application to the undersigned.

Such application must be accompanied by a deposit of 5s., which will be returned on receipt of a *bonâ-fide* tender.

Tenders to be sent to the undersigned, endorsed "Tenders for Single-Phase Transformers," and must be received by them not later than 12 noon on Tuesday, October 7, 1913.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

McILWRAITH, McEACHARN AND CO., PTY., LTD.,
Billiter Square Buildings, London, E.C.,
Agents for Melbourne City Council.

## POSITION VACANT.

### TORQUAY TRAMWAYS COMPANY, LTD.

PLATELAYER.

Applications are invited for the above position. Candidates must have experience in maintenance work, and must be able to, or willing to learn to, drive a car when required.

Applications, stating experience and wages required, together with copies of testimonials, to be forwarded to the undersigned.

H. HOLLIDAY,
Engineer and Manager.

Car Sheds, Torquay.


**Ilford's Position Against Competition.**—Mr. Harvey, the manager of Ilford Council tramways, has reported that there was a deficit of £2,000 on the past year's working. Personally, however, he was optimistic about the future. Since the 1st of April they had carried more passengers to date than they carried in the corresponding period of last year. The chairman (Councillor Cullis) said the public must realise that, although they had been mulcted to a slight extent as far as their rates were concerned, but for the existence of the tramway undertaking that amount of money, and more than that, would go out of their pockets in the way of fares to opposition companies, who would have an entire monopoly.

## COPPER AND ALUMINIUM MARKET.

September 19, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, Sept. 19. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 74 2 6 | 72 15 0 | 78 13 9 |
| ,, ,, (three months) .. .. | 73 17 6 | 72 12 6 | 79 13 9 |
| Electrolytic Copper—bars or ingots .. | 78 0 0 | 77 5 0 | 81 15 0 |
| Aluminium—bars or ingots .. .. .. | 86 10 0 | 86 10 0 | 79 0 0 |

## COAL MARKET.

September 19, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, Sept. 19. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 | 25 0 | 22 9 | 21 3 |
| Best Seconds.. .. .. | 23 9 | 23 9 | 22 0 | 20 9 |
| Ordinary Drys .. .. | 21 0 | 21 0 | 20 3 | 19 3 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | 19 6 | 18 6 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 18 0 | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 | 20 6 | 17 3 | 17 3 |
| Best Seconds .. .. | 19 3 | 19 3 | 16 6 | 16 9 |
| Ordinary Drys .. .. | 16 6 | 16 6 | 14 9 | 15 3 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 14 0 | 14 6 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 12 6 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 14 9 | 15 0 | 13 6 | 11 3 |
| Best Seconds .. .. | 13 6 | 13 6 | 11 0 | 10 0 |
| Smalls .. .. .. | 8 6 | 8 6 | 10 0 | 5 3 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Sept. 16 | £50,815 | £50,168 | 37 | £2,044,346 | +£172,693 |
| Auckland..... (14 days) | Aug. 29 | 18,602 | 19,543 | 9 | 41,610 | + 1,150 |
| Ballarat and Bendigo | Aug. 3 | 830 | 806 | 18 | 15,934 | — 190 |
| Brazilian St. Rly. Mlrs | July | 41,756 | 49,058 | 53 | 545,185 | + 24,923 |
| Brazilian Traction..... | Sept. 13 | 86,313 | 99,064 | 37 | 3,300,680 | + 471,437 |
| Brisbane ..... | August | 27,680 | 29,970 | 34 | 207,178 | + 48,784 |
| British Columbia .....$ | June | 498,308 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacroze.. | August | 41,677 | 44,462 | 8 | 89,684 | + 6,009 |
| Calcutta.....Rs. | Sept. 13 | 67,616 | 70,506 | 37 | 23,65,200 | +1,20,645 |
| Cape Town ..... | July | 10,875 | 11,417 | 30 | 86,900 | + 5,182 |
| Carthagena & Herrerias | August | 2,151 | 2,192 | 34 | 23,317 | + 6,983 |
| East India ..... | August | 1,922 | 2,005 | 4 | 2,005 | + 83 |
| Kalgoorlie..... | August | 3,897 | 3,357 | 34 | 23,379 | — 2,158 |
| La Plata..... | August | 3,601 | 4,641 | 8 | 40,983 | + 9,040 |
| Lima..... | August | 31,828 | 33,900 | 34 | 266,537 | + 12,333 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Sept 15 | 26,776 | 29,097 | 36 | 459,302 | + 33,976 |
| Melbourne ..... | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico .....$ | August | 578,658 | 635,445 | 34 | 4,511,587 | + 90,889 |
| Montevideo..... | August | 26 249 | 28,829 | 34 | 316,481 | + 26,324 |
| Para ..... | Sept. 14 | 3,853 | 3,633 | 41 | 164.198 | + 1,440 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | July | 3,126 | 3,356 | 30 | 25,127 | + 6,662 |
| Shanghai .....$ | Sept. 10 | 20,913 | 24,000 | 36 | 783,652 | + 84,918 |
| Singapore .....$ | Sept. 13 | 11,770 | 12,141 | 37 | 439,970 | + 54,990 |
| Toronto .....$ | June | 696,980 | 815,206 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....$ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |


# DICK, KERR & CO.,
**Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

# TRAMWAYS & LIGHT RAILWAYS
**at home and abroad.**


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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Sept. 10 | £1,512 | £1,707 | + £195 | 15 | £26,115 | + £1,744 |
| Ayr Corporation ..... | ,, 13 | 326 | 344 | + 18 | 17 | 8,614 | + 949 |
| Bath Electric ..... | ,, 10 | 1,030 | 1,199 | + 169 | 37 | 36,422 | + 2,853 |
| Birkenhead Corp. ..... | ,, 14 | 1,223 | 1,259 | + 36 | 24 | 31,251 | + 3,047 |
| Birmingham Corp. ..... | ,, 13 | 10,602 | 12,047 | + 1,445 | 24 | 273,872 | + 20,248 |
| Blackburn Corporation | ,, 10 | 1,236 | 1,532 | + 296 | 24 | 32,395 | + 3,116 |
| Blackpool & Fleetwood | ,, 13 | 1,623 | 2,009 | + 386 | 11 | 21,948 | + 3,480 |
| Blackpool Corporation | ,, 11 | 3,061 | 4,498 | + 1,437 | 23 | 59,501 | + 9,268 |
| Bolton Corporation ..... | ,, 14 | 2,571 | 2,697 | + 126 | 24 | 66,285 | + 3,627 |
| Bournemouth Corp..... | ,, 17 | 2,273 | 2,534 | + 261 | 24 | 56,699 | + 6,575 |
| Bradford Corporation... | ,, 13 | 5,409 | 6,391 | + 982 | 24 | 144,505 | + 9,174 |
| Brighton Corporation... | ,, 14 | 1,175 | 1,368 | + 193 | 24 | 29,418 | + 1,694 |
| Bristol ..... | ,, 12 | 7,413 | 8,710 | + 1,297 | 36 | 295,563 | + 41,329 |
| British Elec. Federatn. | ,, 13 | 39,293 | 55,420 | * | ... | ... | ... |
| Burnley Corporation ... | ,, 13 | 1,615 | 1,984 | + 369 | 24 | 41,515 | + 5,364 |
| Burton-on-Trent Corp. | ,, 14 | 265 | 296 | + 31 | 24 | 7,070 | + 267 |
| Bury Corporation..... | ,, 15 | 1,382 | 1,377 | + 45 | 24 | 33,044 | + 1,203 |
| Cardiff Corporation..... | Aug. 23 | 2,600 | 2,956 | + 356 | 31 | 58,075 | + 6,350 |
| Chatham and District.. | Sept. 11 | 863 | 1,021 | + 158 | 36 | 31,540 | + 1,870 |
| Chesterfield Corp. ..... | ,, 11 | 213 | 256 | + 43 | 23 | 6,151 | + 787 |
| Colne & Trawden..... | ,, 13 | 302 | 350 | + 48 | 37 | 10,222 | + 721 |
| Cork Electric..... | ,, 11 | 510 | 563 | + 53 | 36 | 18,257 | + 312 |
| Croydon Corporation .... | ,, 5 | 1,791 | 1,530 | — 261 | 22 | 38,184 | — 4,572 |
| Darlington Corporation | ,, 13 | 222 | 259 | + 37 | 24 | 6 020 | + 581 |
| Derby Corporation ..... | ,, 13 | 859 | 995 | + 136 | 24 | 23,988 | + 2,584 |
| Dover Corporation ..... | ,, 13 | 257 | 302 | + 45 | 24 | 6,508 | + 29 |
| Dublin & Lucan ..... | ,, 12 | 165 | 143 | — 22 | 10½ | 1,952 | + 162 |
| Dublin United ..... | ,, 12 | 5,947 | 3,111 | — 2,836 | 36 | 213,916 | — 1,053 |
| Dundee City ..... | ,, 10 | 1,402 | 1,332 | — 70 | 17 | 22,740 | + 1,766 |
| East Ham Corporation | ,, 13 | 1,035 | 987 | — 48 | 24 | 24 442 | — 1,171 |
| Exeter Corporation ..... | ,, 12 | 369 | 404 | + 35 | 24 | 8,652 | + 363 |
| Gearless Motor 'Buses. | ,, 13 | ... | 631 | ... | 23 | 10,839 | ... |
| Glasgow Corporation ... | ,, 13 | 19,164 | 20,439 | + 1,275 | 15 | 297,186 | + 21,028 |
| Glossop(U.Elec.Supply) | ,, 13 | 128 | 149 | + 21 | 37 | 4,796 | + 541 |
| Halifax Corporation ... | ,, 9 | 1,935 | 2,216 | + 281 | 23 | 51,032 | + 1,067 |
| Hastings & District..... | ,, 11 | 1,344 | 1,462 | + 118 | 37 | 39,344 | + 2,863 |
| Huddersfield Corp. ..... | ,, 13 | 1,917 | 2,362 | + 445 | 24 | 51,823 | + 3,404 |
| Hull Corporation ..... | ,, 13 | 2,875 | 3,090 | + 215 | 24 | 73,116 | + 3,427 |
| Ilford U.D.C. ..... | ,, 13 | 416 | 460 | + 44 | 24 | 11,029 | — 1,582 |
| Ilkeston Corporation ... | ,, 17 | 129 | 140 | + 11 | 25 | 3,323 | + 578 |
| Ipswich Corporation ... | ,, 13 | 471 | 568 | + 97 | 24 | 11,815 | + 321 |
| Isle of Thanet ..... | ,, 13 | 1,353 | 1,514 | + 162 | 50 | 34,580 | + 1,728 |
| Kilmarnock Corp. ..... | ,, 13 | 150 | 168 | + 18 | 17 | 3.183 | + 241 |
| Lanarkshire ..... | ,, 11 | 1,563 | 1,815 | + 252 | 36 | 60,616 | + 7,497 |
| Lancashire United ..... | ,, 10 | 1,427 | 1,808 | + 381 | 36 | 55,497 | + 6,123 |
| Leeds City ..... | ,, 13 | 7,762 | 8,534 | + 772 | 24 | 199,078 | + 13,328 |
| Leicester Corporation... | ,, 13 | 2,489 | 2,844 | + 355 | 37 | 102,856 | + 9,553 |
| Leith Corporation ..... | ,, 13 | 636 | 705 | + 69 | 17 | 12,902 | + 401 |
| Liverpool Corporation.. | ,, 13 | 11,672 | 13,291 | + 1,619 | 36½ | 473,282 | + 35,536 |
| Llandudno &Colwyn B. | ,, 12 | 613 | 681 | + 68 | 41 | 15,036 | + 1,297 |
| London County Council | ,, 10 | 40,140 | 41,866 | + 1,726 | 23 | 976,726 | + 19,214 |
| London Gnl. Omnibus.. | ,, 13 | 57,644 | 64,592 | + 6,948 | 37 | 2,293,341 | + 458,375 |
| London United ..... | ,, 12 | 6.270 | 6,758 | + 488 | 37 | 233,463 | + 1,543 |
| Lowestoft Corporation | ,, 13 | 276 | 336 | + 60 | 49 | 10,745 | + 465 |
| Maidstone Corporation | Aug. 14 | 205 | 212 | + 7 | 21 | 4.147 | + 204 |
| Manchester Corp..... | Sept. 13 | 16.211 | 17.787 | + 1,576 | 24 | 422,519 | + 21.381 |
| Met. Elec. Trys. ..... | ,, 12 | 8,778 | 9,540 | + 762 | 37 | 332,775 | + 8,423 |
| Nelson Corporation..... | ,, 6 | 224 | 214 | — 10 | 23 | 4,971 | + 303 |
| N'castle-on-Tyne Corp. | ,, 13 | 4,248 | 4,863 | + 615 | 24 | 115,010 | + 9,987 |
| Newport (Mon.) Corp.... | ,, 13 | 701 | 802 | + 101 | 24 | 18.412 | + 1,332 |
| New St. Helens & Dist... | ,, 10 | 762 | 890 | + 128 | 11 | 9,935 | + 1,271 |
| Northampton Corp ..... | ,, 12 | 515 | 579 | + 64 | 23½ | 14,012 | + 660 |
| Nottingham Corp. ..... | ,, 11 | 3,014 | 3,311 | + 297 | 23½ | 78,535 | + 2,880 |
| Oldham Corporation ... | ,, 14 | 2,077 | 2,204 | + 127 | 25 | 55,237 | + 3,338 |
| Portsmouth Corp..... | ,, 13 | 2,232 | 2,818 | + 586 | 24 | 59,169 | + 2,772 |
| Preston Corporation ... | ,, 10 | 810 | 863 | + 53 | 24 | 21,432 | + 1,131 |
| Provincial ..... | ,, 13 | 2,067 | 2,425 | + 358 | 50 | 93,866 | + 6,576 |
| Reading Corporation ... | ,, 11 | 635 | 746 | + 111 | 23½ | 18,620 | + 1,061 |
| Rochdale Corporation | ,, 13 | 1,496 | 1,680 | + 184 | 24 | 39,305 | + 1,488 |
| Rotherham Corp..... | ,, 17 | 795 | 1,038 | + 243 | 24 | 24,166 | + 6,283 |
| Salford Corporation ... | ,, 15 | 4,951 | 5,201 | + 250 | 24 | 126,866 | + 4,643 |
| Sheffield Corporation... | ,, 14 | 6,765 | 7,271 | + 506 | 25 | 181,694 | + 16,367 |
| Southampton Corp..... | ,, 10 | 1,312 | 1,462 | + 150 | 23 | 32,080 | + 1,372 |
| Southend-on-Sea Corp. | ,, 8 | 1,116 | 1,435 | + 320 | 23 | 24,483 | + 3,617 |
| South Met. Trys. ..... | ,, 12 | 850 | 1,178 | + 328 | 37 | 32.689 | + 1,195 |
| South Shields Corp..... | ,, 13 | 642 | 751 | + 109 | 23 | 17,812 | + 2,428 |
| Sunderland Corp..... | ,, 14 | 1.341 | 1,426 | + 85 | 24 | 35,814 | + 3,973 |
| Sunderland District ... | ,, 10 | 494 | 575 | + 81 | 45 | 24,770 | + 4,512 |
| Swindon Corporation ... | ,, 10 | 166 | 181 | + 15 | 23 | 3,974 | + 291 |
| Trys. (M.E.T.) 'Buses | ,, 13 | ... | 9,140 | ... | 33 | 143,543 | ... |
| TynesideTrys.&Tmrds. | ,, 10 | 473 | 543 | + 70 | 11 | 5.900 | + 523 |
| Wallasey Corporation | ,, 13 | 1,083 | 1,294 | + 211 | 24 | 30.977 | + 2,814 |
| Walsall Corporation ... | ,, 13 | 580 | 629 | + 49 | 37 | 22,871 | + 1,583 |
| Walthamstow U.D.C.... | ,, 18 | 676 | 802 | + 126 | 24 | 18,457 | — 170 |
| Warrington Corp ..... | Aug. 28 | 431 | 428 | — 3 | 22 | 9,649 | + 331 |
| West Ham Corporation | Sept. 11 | 2,521 | 2,718 | + 197 | 23 | 64,606 | + 1,634 |
| Wigan Corporation ..... | ,, 11 | 1,324 | 1,513 | + 189 | 23½ | 34,800 | + 3,672 |
| Wolverhampton Corp | ,, 17 | 1 022 | 1.074 | + 52 | 25 | 23,831 | + 1,493 |
| Yorkshire (W. Riding | ,, 14 | 1,364 | 1,468 | + 104 | 37 | 53,568 | + 5,836 |

From such of the services as were working both last year and this year the receipts show an increase of £4,225 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Sept. 13 | £4,777 | £4,039 | — £738 | 37 | £173,458 | + £9,894 |
| City and South London | ,, 13 | 2 885 | 2,644 | — 241 | 37 | 103 257 | — 9,750 |
| Liverpool Overhead..... | ,, 14 | 1,604 | 1,732 | + 128 | 37 | 63,627 | + 4,991 |
| London Electric..... | ,, 13 | 12,340 | 11,970 | — 370 | 37 | 591,900 | + 3,815 |
| Mersey ..... | ,, 13 | 2 285 | 2,234 | — 51 | 37 | 82.233 | + 4,957 |
| Metropolitan ..... | ,, 14 | 16,699 | 17.678 | + 979 | 37 | 629,630 | + 15,380 |
| Metropolitan District... | ,, 13 | 12,299 | 12,162 | — 137 | 37 | 477,739 | + 18,182 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, September 19. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 74 — 77 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¼ — 4⅜ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅛ — 4⅜ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 92 — 94 |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 96 — 98 |
| 100 | Do. 5% Deb. Stk. Red.... | ... | 98½ —100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅜ — ⅝ |
| 1 | Do. 5% Cum. Pref ..... | ... | 31/32 — 1 1/32 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 73 — 77 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11⅛ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | + 2¼ | 97¾ — 98¼ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 7⅛ — 7⅝ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | + ⅛ | 99 —102 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6¼ |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¾ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 1 | 126 —129 |
| 100 | Do. Pref. Ord. Stock ..... | + 1 | 113 —116 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | + 1 | 103 —106 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | + 1 | 94 — 96 xd |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 86 — 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 48 — 51 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | + 1 | 12 — 13½ |
| 100 | Do. Deferred Ord. Stock ..... | ... | 4½ — 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | + 2 | 94 — 97 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 78 — 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 5¾ — 6¼ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ⅛ — ⅜ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs., Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5⅛ — 5⅜ |
| 100 | Do. 4% Debenture Stock Red, 1935 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. .... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | ... | — 10¾ |
| 10 | Do. do. 6% Pref. ..... | ... | — 12 |
| 100 | Do. do. "A" Red. ..... | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79½ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | + ¼ | 8¾ — 9¼ |
| 10/- | Hastings & Dist. Electric Trams. Co. Ld., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | 3/32 — 5/32 |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 68 — 73 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ... ..... | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum. Pref..... | — ¼ | 6½ — 7 |
| 100 | Do. do. 4½% Deb. Stock ..... | — ½ | 78 — 79 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2⅛ — 2⅝ |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 1/16 — 3/32 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | 29/32 — 1 1/32 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¾ — 10¾ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord..... | — 3/32 | 1 — 1¼ |
| 1 | Do. 6% Cum. Pref. ..... | — 1/16 | 7/8 — 1 1/16 |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — ⅜ |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | — ⅛ | 96 — 98 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 61 — 65 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 4¾ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 111 —114 |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 29/32 — 1 1/32 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ... | — 2 | 82 — 86 |
| 100 | Do. do. 5% Deb. Stock, Red. ... | — 1 | 89 — 92 |
| $100 | Mexico Tramways Co., Common Stock ..... | — ½ | 97⅛ — 98⅛ |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | + 1 | 90½ — 92½ |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | ... | 93⅛ — 95½ |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) .. | ... | 97 —100 |
| 1 | National Steam Car Co. Ltd. ..... | + 1/16 | 1 1/16 — 1 3/16 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6¼ — 6½ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6 — 6⅛ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord..... | ... | 1 1/16 — 1 3/16 |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | 7/16 — 1/2 |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim., Ord. ..... | ... | 3/4 — 7/8 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97⅛ —100⅛ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5 %.. | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5¼ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | + ¼ | 102 —103 |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | + ¾ | 96¾ — 97¾ |
| $100 | Sao Paulo Tramway, Light & Power Co., Lim. ..... | ... | — |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | + ½ | 102⅛ —104⅛ |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 8½ — 9⅛ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 — 89 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | 5/8 — 3/4 |
| 100 | Do. do. 4% Deb. Stk..... | ... | 68 — 72 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. .... | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 87 — 89 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83¾ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord..... | ... | 4 5/8 — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4 1/8 — 5 1/8 |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ —100½ xd |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | 1/8 — 5/8 |
| 5 | Do. do. 6% Cum. Pref..... | ... | 3 3/8 — 3 7/8 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 16. ] LONDON, SATURDAY, SEPTEMBER 27, 1913. [ Established in 1892.

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Including sixty-four issues, of which twelve are large Illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### BOMBAY, BARODA, AND CENTRAL INDIA RAILWAY CO.

The Directors are prepared to receive up to noon on Wednesday, the 8th October, tenders for the supply to this Company in Bombay of 18,000 Tons Best South Wales Steam Coal, or, by preference, one of the following varieties, viz:—

| | |
|---|---|
| Ferndale, | Powell Duffryn, |
| Albion, | Insole's Cymmer, or |
| Nixon's Navigation, | National Merthyr. |

Tenders for the supply of any coal on the Admiralty List will, however, receive consideration.

The coal is to be in all cases of the best quality mined, to be shipped under inspection on behalf of this Company, and to be delivered in Bombay by three equal instalments in December, 1913, and February and May, 1914.

Tenders must be made on forms to be obtained at these offices, and must quote prices in Indian currency per ton delivered. Payment will be made only in Bombay, and for the quantity delivered there, and if each instalment as above be not all shipped in one vessel, as follows, viz.: 90 per cent. on each cargo on completion of discharge, and the remaining 10 per cent., on due completion of such instalment of the contract.

The Directors reserve the right of dividing the contract between any two or more tendering firms, and do not bind themselves to accept the lowest or any tender.

C. CROMMELIN,
Secretary.

Offices: Gloucester House, 110, Bishopsgate, E.C.,
September 24, 1913.

N.B.—Other conditions being equal, preference will be given to tenders naming average discharge at Bombay at a rate not exceeding 500 tons per lawful working day, and Bills of Lading must contain the Company's usual delivery clause.

### ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria, Australia, is prepared to receive new tenders for the

20,000-volt High-Tension Switchgear,
Low-Tension Switchgear and Accessories

for the power station and sub-stations to be constructed in connection with the electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from the Agent-General for Victoria on or after Monday, September 22, 1913. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to the consulting engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification is £5 5s. for the first copy and £2 2s. each for any further copies. Sums paid for copies will be refunded on receipt of a *bonâ-fide* tender for the whole of the works included in the specification.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways—Tenders for Switchgear and Accessories," are to be addressed to the Agent-General and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 o'clock (noon) on Monday, October 13, 1913.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

### KEIGHLEY CORPORATION.

ELECTRICITY DEPARTMENT.

6,600 VOLTS THREE-PHASE ALTERNATING CURRENT TRANSMISSION LINE.

Tenders are invited for an Overhead Transmission Line in duplicate, suitable for conveying electrical energy at 6,600 volts, three-phase alternating current, frequency 50 cycles per second.

The length of the line will be slightly over two miles.

The line must be constructed in accordance with the latest model regulations of the Board of Trade for electric lines placed above ground.

Full particulars, and copies of the specification and form of tender, may be obtained on payment of a deposit of £2 2s., which will be returned on receipt of a *bonâ-fide* tender.

Extra copies of the specification may also be obtained at 10s. per copy, which will not be returned.

A route plan, showing pole positions and general lay out, can also be had at 10s. per plan, which will not be returned.

The latest date for receiving tenders will be the 1st October, 1913.

It is imperative that the work must be completed by the end of November, 1913.

Applications for tenders, etc., to be made in writing to the undersigned.

HARRY WEBBER, A.M.I.E.E.,
Borough Electrical Engineer and Tramways Manager.
Electricity Offices and Works,
Coney Lane, Keighley.

### MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply of the following, viz.:—

(a) Permanent Way Special Trackwork.
(b) Permanent Way Points, Tongues, and Hardened Steel Centres.
(c) Granite Setts.

Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester. Applications for (a) or (b) must be accompanied by a deposit of £1 1s. for each specification, which will not be returned except on receipt of a *bonâ-fide* tender.

Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, October 21, 1913.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.
Town Hall, Manchester,
September 24, 1913.

### COUNTY BOROUGH OF SOUTH SHIELDS.

CORPORATION ELECTRIC SUPPLY DEPARTMENT—CONTRACT NO. 87.

The Corporation invite tenders for the supply, delivery, and erection of

One 2,000 Kilowatt Turbine, Direct Coupled to Two 3-Phase Generators, in Tandem together, with Condensing Plant, Rotary Converters, Transformers, and Switchgear, etc.

Single copies of specification, general conditions, form of tender, and form of contract can be obtained on and after September 27, 1913, from Mr. Harry S. Ellis, Borough Electrical Engineer, South Shields, on payment of one guinea, which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of ten shillings per copy, which will not be refunded. Tenders on the form supplied, sealed and endorsed "Tenders for Steam Turbine Plant," must be delivered to me at my office, Municipal Buildings, South Shields, on or before noon of October 15, 1913. The Corporation do not bind themselves to accept the lowest or any tender, and any acceptance will be subject to the sanction of the Local Government Board being obtained to the carrying out of the work.

J. MOORE HAYTON,
Town Clerk.
September 22, 1913.

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## COUNTY BOROUGH OF SOUTH SHIELDS.

CORPORATION TRAMWAYS DEPARTMENT.

The Corporation are prepared to receive tenders for the supply and delivery of Five or Ten Top-Covered Tramcars complete.

Single copies of the specification, conditions, and form of tender, and also form of contract can be obtained on application to Mr. W. Tuke Robson, Tramway Manager, Dean Road, South Shields, on payment of £1 1s., which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of 10s. per copy, which will not be refunded. Tenders, on the form supplied, must be delivered to me in the envelope provided, at my office, Municipal Buildings, South Shields, on or before noon on Saturday, October 25 next endorsed "Tender for Tramcars."

J. MOORE HAYTON,
Town Clerk.

September 23, 1913.

## COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington are prepared to receive tenders for the following:—

1. Low Tension Cable.
2. Low Tension Feeder Panel.

Specifications and form of tender can be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a *bonâ-fide* tender. Five shillings each will be charged for extra copies of either specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax, and endorsed "Tender for Cable," or "Feeder Panel," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, October 14, 1913.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

## POSITION VACANT.

### BOROUGH OF ASHTON-UNDER-LYNE.

CHIEF CLERK.

The Tramways Committee invite applications for the position of Chief Clerk at a salary of £104 per annum.

Applicants must have had previous experience in the general offices of a Tramways Undertaking.

Applications, in applicant's own handwriting, endorsed "Clerkship," stating age and qualifications, accompanied by copies only of three recent testimonials, must be addressed to the undersigned, and delivered on or before the 6th October at noon.

The successful applicant will be required to join the Officers and Servants' Superannuation Scheme, particulars of which may be seen on application.

JOHN NEAL,
Town Hall, Ashton-under-Lyne. Borough Comptroller.


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WATERTIGHT FITTINGS FOR CAR SHEDS.
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Tramway Engineers,

Sole Selling Agents for S. Dixon & Sons' Tramway Material,

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The "Peacock" Improved Brake.

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27, CLEMENTS LANE, LONDON, E.C.

*Telephone No.:* 5735 CENTRAL.
*Telegraphic Address:* "INBRAKE," LONDON.

*British, Foreign and Colonial Representatives:—*

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 2', Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

**Established in 1892 and Published by**

*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, SEPTEMBER 27, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## TRAMWAYS AND MOTOR OMNIBUSES DISCUSSED AT SHEFFIELD.

The twelfth conference of the Municipal Tramways Association, which was held at Sheffield this week under the presidency of Mr. A. R. Fearnley, general manager of the Sheffield Corporation Tramways, was more numerously attended than any of the previous conferences, and in other respects it was also a thoroughly successful gathering. Some of those who went conscientiously through the programme described themselves as having condensed into three days experience what might have well filled a week. The work of the conference began on Wednesday morning, when the Lord Mayor cordially welcomed the delegates. Mr. Fearnley's presidential address, which was well received, formed an interesting and candid review of the tramway position to-day. On the outstanding question of the motor omnibus, Mr. Fearnley took the sane view that while there was no reason to anticipate the supersession of the tramway, he believed it to be advisable for tramway owners to experiment with omnibus services. That was being done in Sheffield, and interesting and valuable facts were being obtained. Alderman Flint's paper on platform fare collection was a description of what Leicester has done with the P.A.Y.E. system. He expressed the opinion that the system was an advantage to them, and in the course of the discussion it was stated that ten additional cars with the P.A.Y.E. arrangements were to be obtained. The discussion elicited no other new facts, but what may be termed the "standard objections" were insisted upon by those who have not yet tried the method which seems to be approved in Aberdeen and Leicester, where, of course, the conditions are somewhat exceptional. It cannot be said, however, that the adverse critics showed any hostility to the innovation, but rather a desire to learn whether their difficulties could be explained away. The maintenance of paving on tramway tracks was the subject of Councillor Fenton's paper, and the discussion emphasised the necessity of a change in legislation governing that matter. The question seems ripe for settlement, and it may be hoped that both tramway associations being in substantial agreement they may persist until the Government are forced to act. "Urban Passenger Transport," or Tramways *v.* Motor Omnibuses, was dealt with on Thursday morning by Mr. J. B. Hamilton in one of the most useful and conclusive papers that has ever been presented to the Municipal Tramways Association. Mr. Hamilton, as he said, has been connected with urban transport for some thirty years, and his experience has well qualified him to speak decisively. His recent exhaustive study of the motor omnibus position is set forth at length in his paper, and his conclusion is that generally speaking there can be no question of the superior advantages of the tramway. The "conviction stood out clear and distinct in his mind that the era of rail transit showed not the slightest sign of being superseded by any other form." Mr. Worby Beaumont, whose paper, recently read at the Imperial Transport Conference, was criticised by Mr. Hamilton, took part in the discussion, but his remarks did not seriously weaken the main conclusions established in the paper. Some of the figures given by Mr. Hamilton as to the relative costs of tramway and omnibus working may require to be modified as the omnibus is improved, but this will not materially affect the position. Hitherto the omnibus has had all the advantage that a permanent way provided without cost entails. When a fair adjustment of charges under this head is made, the position of the tramway will be immensely strengthened. Mr. Hamilton's paper comes at an opportune time and should do much to check the uninformed criticism of tramways that so often fills the columns of the daily newspapers.

## PROFIT SHARING AND BONUSES.

The situation which has arisen in Belfast in connection with the profit-sharing scheme for tramway employees is an interesting one. The men are paid fixed wages like other men, but they were, in addition, to receive bonuses, the amount of which would depend on the profits of the undertaking for each financial year, and would be 10 per cent. of such profits. Bonuses for freedom from accident, saving of electrical energy, good conduct, or what-not are familiar enough on British tramways, but the Belfast arrangement is a pure profit-sharing one, the amount to be paid, in addition to wages, to every man being the same. For 1912, the first year of the scheme, the amount available as the employees' share of the profits was £2,800, and this was shared out equally, every man from the manager downwards receiving £4 1s. 2d. Naturally, the arrangement gave much satisfaction to the employees, and it is one calculated to make them energetic and willing workers. If a tramway company were to adopt such a scheme, there could probably be no objection to it. The Belfast Corporation before adopting it took the opinion of eminent counsel, which was to the effect that the arrangement was legal. Now comes along the auditor of the Irish Local Government Board who declares it an illegal use of profits which belong to the ratepayers, and surcharges three members of the Council with the amount. Of course, the matter cannot rest there; an appeal is to be made to the Local Government Board, and probably there will be litigation if that is not successful. It is worth while noticing that in his last report the manager of the

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Dewsbury Electricity Works proposes a profit-sharing scheme. If the final decision goes against Belfast Corporation, they will—unless there is some special difference in the law in Ireland—be able to fall back on the ordinary bonus system with which we are familiar in England. Experience has shown that so strong is the inducement of the bonus, which, by the way, is independent of what the profits may be, that an overwhelming proportion of the men earn it. To put it on a similar footing with profit-sharing, however, it must be applicable to other tramway employees as well as to the running staff. It is beyond question that profit-sharing or a bonus system is one of the most powerful instruments for securing efficient service and for minimising the risk of strikes. Moreover, it puts an interest hitherto little known into every man's work and it gives him a pride in it as a direct sharer in the revenues of the undertaking. One cannot but regret that the forward step taken by Belfast Corporation and Mr. Nance should have received a rude check, but it may be hoped that the check is only temporary, and that formal legal objections may be overcome. If not, then, as already noted, they may not be valid, even in Ireland, against a system of bonuses such as we have in England.

## MUNICIPAL TRAMWAYS ASSOCIATION.

### TWELFTH ANNUAL CONFERENCE AT SHEFFIELD.

About two hundred representatives of municipal tramway undertakings attended the twelfth annual conference of the Municipal Tramways Association (Incorporated) at Sheffield on Wednesday, Mr. A. R. Fearnley, the general manager of the Sheffield tramways, being the President for the year. The Corporation placed the Council Chamber of the Town Hall at the disposal of the conference, and the delegates were welcomed by the LORD MAYOR (Alderman Osborn), who also read a letter of welcome and apology for his own absence from Sir Wm. Clegg, the chairman of the Tramways Committee, who was at Wiesbaden. The Lord Mayor remarked that in Sheffield the tramways more than anything else had helped to solve what might have been a very serious problem of housing. Sheffield had been fortunate in having been served by two managers who had proved themselves to be at the forefront of their profession. Of Mr. Fell's inauguration of their present system the city had the most pleasurable and grateful recollection, and the way in which Mr. Fearnley had met the increasing demands and faced increasing difficulties had been beyond all praise. Sheffield had taken a foremost place in the supply of tramway requisites, and they had reason to believe that the city would retain that pre-eminence.

Councillor BESCOBY, vice-chairman of the Tramways Committee, supported the welcome, and remarked that if the experts assembled there had little to learn from Sheffield the city could at least show how journeys of three or four miles could be run for a universal penny fare.

Alderman J. MILES (Bolton) proposed a vote of thanks to the Lord Mayor and Corporation and Tramways Committee for their welcome and hospitality.

Mr. A. L. C. FELL (London), in seconding, said it was particularly gratifying to return to the city where he spent seven pleasurable years of hard labour, and to note that Sheffield had tried everything that could be tried in the tramway world, with the result that they had now the very best. (Applause.)

PRESIDENT'S ADDRESS—IMPROVEMENTS IN TRAMWAY OPERATION.

The PRESIDENT (Mr. A. R. Fearnley, general manager, Sheffield Corporation tramways), in the course of his address, gave the number of directions in which steady improvement and progress had taken place. Nineteen applications had been made since the last conference by municipalities for Provisional Orders relating wholly to or containing clauses as to tramways, motor omnibuses, or railless traction powers. In actual tramway operation, improvements were constantly being brought about. There was a tendency on all their systems to improve "running time." In Sheffield large sums were being spent in removing small equipments with which cars were fitted twelve or fourteen years ago, and replacing them with equipments double the size and of an improved type—the interpole motors having proved a success and now being generally adopted as more capable of coping with the heavier traffic requirements. In those towns which were early in the field with electric traction, car bodies were already being re-designed and re-constructed, giving easier and safer access, covered top decks and increased carrying capacity. Speeds were gradually being increased, with the consequent result that calls had been made upon the power house and permanent way branches of the department earlier than they would have been under the old condition of things. As a result of the experience gained, better work was being put into tramway tracks to-day. The mechanical joint was rapidly becoming obsolete, and welded joints, either electrical, Thermit, or cast, being almost universally adopted.

VALUABLE RESULTS FROM LINKING UP POWER STATIONS.

The idea of isolating the tramway power house from the other supply stations in the Sheffield district was, in consequence of the experience gained in many different parts of the country, now being abandoned, and in that city they hoped before the end of the year to have completed arrangements by which any of the three power houses would be available for tramway supply in case of heavy load and at other necessary times. In other words, the plant which was being used during 5½ days in the week to supply power to the large works in the east end of the city would be available for their week-end, bank holiday, and football traffic. The arrangement, which promised to work out in an economical manner for both the tramway and electric supply departments, was in the best interests of the city as a whole, and was certainly a necessary insurance for the continuity of the electric supply service of the city. Despite the cost of these extra payments and expenses, and increased wages, working costs were being kept at a very moderate figure, and they found themselves in the happy position of being able to provide, on their municipal tramways, cheaper passenger transport facilities than were to be found elsewhere.

PENNY STAGES, RATING, AND THE SELECT COMMITTEE ON MOTOR TRAFFIC.

There appeared to be growing up amongst the larger towns a keen rivalry as to which town should give the cheapest rides. The tendency appeared to be to gradually increase the length of the penny stage to distances which a few years back were thought impossible, and in those towns where this policy had been pursued for some length of time it could be said, with certainty, that, so far as financial results are concerned, and also in what is of more importance, so far as the interests of the municipality as a whole were concerned, the policy is sound. He ventured the opinion that it was one of the most valuable assets of all large towns to be able to transport their passengers a distance of three miles from the centre for a penny, and that very wide benefits were and would be derived from a policy of this description. Referring to the decline of 32 million passengers on the railways in 1912 the President said that in the same year tramways showed an increase of 220 million passengers. For some reason or other the electrification of English railways made little progress, or tramway managers would probably have cause to take a closer interest in their suburban traffic than they did at the present time. The reversal by Parliament of the House of Commons Committee's decision to give compulsory running powers on the London County Council tramways was a notable victory for the latter body, and might be useful to many other tramway authorities on future occasions. The decision of the Lords of Appeal on the rating of tramways was a disappointment, and meant a reversion to the previous heavy charge. Adverting to the report of the Select Committee on Motor Traffic in London, the President said it appeared clear from the report that if this traffic had been under municipal control the necessity for the Select Committee's appointment would never have arisen. The lesson to all provincial municipalities was clear, whether the street traction be tramways, 'buses, or trolley vehicles, they must do the work themselves, and thus ensure a service which they could control in every way. The essentials on which the Committee agreed were control by a Government department in consultation with local authorities. Whatever might be the opinion regarding Board of Trade supervision, municipal tramway operators would agree that for the last few years the Board had adopted a broad and wise policy in connection with its tramway work, by consulting and discussing with the representative associations alterations and innovations which had been necessary.

SUGGESTED EXPERIMENT IN SUBSTITUTING 'BUSES FOR TRAMWAYS.

If motor enthusiasts were any guide electric tramways were going to have a somewhat shorter life than either of their predecessors. It was quite clear that whatever the results of present developments might be, the leading municipalities intended still to control the systems of traction, and it remained for them to see that their sinking funds were in such a healthy state that they would be in a position to take advantage of any change that might be found to be advisable. There would, he was sure, be unanimity in supporting the resolution put forward by the Croydon and other Metropolitan Councils urging the Government to pass legislation to place motor 'bus companies on terms of equality with municipal tramways in regard to public obligations. A number of municipalities were now faced by the question of either extending their tramways or using the motor vehicle or trolley car. It was now more a problem of the road than the vehicle. On the other hand, there was a large mileage of tramway permanent way which required, or would shortly require, renewal. Here, then, was an opportunity for some authority to make an interesting and valuable experiment by taking an existing tramway route the traffic results of which were well known and deciding that the tramway service on this route should at least experimentally, if not permanently, be withdrawn and a suitable road surface be laid down, and motor 'buses or trolley vehicles substituted for the cars. There would be some advantages to the residents in the district selected, such as—a quiet running vehicle; the entire absence of the tramway rail; the probability of a more frequent service but with less saloon or covered accommodation; the opportunity for the road authority to provide an ideal surface for modern forms of traffic. Although, as far as he could see at present, there was little likelihood of the motor 'bus taking the place of the tramcar for heavy traffic, great improvements were likely to be made in the efficiency of the present vehicles. He did not suppose they would long continue to

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use a gallon of petrol per 7½ miles run. A home produced motor spirit would give considerable impetus to the adoption of the motor 'bus in the provinces. He could not understand the hesitation of the London 'bus companies in declining to give publicity to the details of their working expenses. It would be a great advantage when reliable figures were published in detail under the form of tramway accounts, as he anticipated they would be early next year by a number of municipal tramway departments. Sheffield Tramways Committee had acquired ten 'buses since February last, and if reasonable use could be made of the vehicles during the winter months there was no doubt the Committee would require a much larger number of 'buses next summer. The President also mentioned that by the kindness of the Tramways Committees and general managers of Bradford and Rotherham examples of different kinds of railless trolley cars were to be seen during the conference working on a short length of a Sheffield tramway route.

Councillor J. H. RODGERS (Newcastle) moved the vote of thanks to the President for his address, and felt delighted that the tramway world had rallied round him in that exceedingly important conference, to which many were looking for a lead in tramway matters. He thought the presidential address did give a lead. Anyhow, it showed that they must move with the times and make progress. They must keep alive with the trackless trolley, the motor 'bus, or any other form of passenger locomotion.

Mr. J. ALDWORTH (Nottingham) seconded, and remarked that the address would repay quiet and careful study.

The motion was enthusiastically carried.

"ADVANTAGES AND DISADVANTAGES OF PLATFORM FARE COLLECTION."

Alderman S. FLINT, chairman, Leicester Corporation Tramways Committee, read a paper on the above subject. The tramways, in Leicester, all centred in the heart of the town; this makes it possible to charge universal penny fares on all the lines. After the conversion to electricity in 1904 the service was quickened, and the number carried increased at such a rate that the work of the conductors, especially at rush hours, became so onerous as to call for some alleviation. This led to a trial of the P.A.Y.E. system on the sections bearing the heaviest traffic. It was started six months ago, and had proved very satisfactory, The conductor collected the fares as the passengers boarded the car, and, except in the case of transfer and workmen's tickets, they were all put into a box on leaving; while the colour and plain signs on the tickets enabled the conductor to detect at a glance whether a passenger was over-riding. In the exceptional cases the tickets had simply to be shown. There were six varieties of tickets for the different through and cross lines on the whole system, and twelve for the P.A.Y.E. section. All these were reproduced in the paper. The accidents from passengers boarding or alighting from cars had been *nil* on this section in the last six months; the conductor never left the platform, and the cars ran to time. All the complaints had been met. One was that passengers on the upper deck had to leave their seats before reaching their destination. They were now allowed to leave by either staircase. Another complaint was that no accommodation was provided for luggage. This had now been provided. A third complaint was that the staircases were narrow and steep. The design had now been improved. Alderman Flint explained the system by which tickets for the two zones, for return, for children, for workers, and for transfers were issued and collected. The paper also included a photograph of the car, a diagram map of the tramway lines, and statistics from 1904 to the end of last year for the whole system and for the special section. The complete financial comparisons could not yet be made, but he could state that there had undoubtedly been an increase in the sectional receipts, quite equal to, and he thought in excess of, the average over the whole system. A number of deputations had visited Leicester to see the P.A.Y.E. system at work, and he had frequently been asked his opinion as to whether it would be workable in towns where the fares were varied and complicated. He could only say that at Leicester they had to deal with a complicated ticket system, and he thought there would be very little difficulty in adopting the P.A.Y.E. method to meet any requirements.

Councillor J. A. SMITH (Aberdeen) stated that the experience of the P.A.Y.E. system on one route in that city was in every way satisfactory. The number of passengers requiring change was only 5 per cent., and they were required at busy times to stand aside and give preference to the "ready money" passengers. The system had effected a saving in time of about one minute per journey—34.2 minutes per journey as against 35.1 minutes on the old system. The system which allowed the rear platform to take care of itself was, in point of public safety, behind the age—an opinion in which he was confirmed by the Chief Constable. Leakage in receipts was entirely prevented by the P.A.Y.E. system, under which the receipts had increased by over £23 per week.

Bailie ALSTON (Glasgow) asked how Alderman Flint's "colour scheme" would work out on a Glasgow route, where the fares varied from ½d. to 7d., and there were 35 halfpenny stages. How much of the £23 per week increase was attributable to natural increase. (Hear, hear.)

Mr. FELL asked what would be the cost of altering cars for operation on the P.A.Y.E. system. In Leicester they must breed a particularly thin conductor to get into the recess provided for him on the divided platform. (Laughter.) One of them explained to him that they were worked so hard that they had no chance to get fat. He had also noticed that in Leicester there was no bell for the upper deck passengers to give notice of their intending descent. If in London they had upper deck passengers wandering about between the stages the number of accidents would be trebled. There was also, he feared, a good deal of time lost at the starting, and in London the waiting passengers would be snapped up by the motor 'buses. (Laughter.) He hoped the system could be satisfactorily developed.

Mr. J. M. MCELROY (Manchester) said that in America the system had practically eliminated the payments of compensation for accidents, which formerly amounted to 5 per cent. of the receipts. He approved of the system in places where a universal or single system of fares obtained, but he doubted its applicability to large towns where there were many overlapping fares. On the latest type of car in America accidents were prevented by making passengers enter at the motorman's end, where the motorman lowered the steps and closed the doors before restarting the car.

Replying to the discussion, Alderman FLINT expressed his belief that in Leicester the system would enable 19 cars to do the work of 20 under the old method. He believed the motor 'bus companies were going to try it. Leicester paid £20 royalty on each car worked on the new system.

Mr. T. R. SMITH (Leicester) added that besides the royalty there was the cost of altering the platforms, etc., which worked out at between £30 and £40 per car.

A company of nearly 300 members and ladies partook of luncheon at the invitation of the Sheffield Tramways Committee, Councillor A. T. Bescoby presiding. Councillor A. J. BAILEY, in proposing the toast of the Association, remarked that during its existence municipal tramways had increased from 1,820 miles to 3,000, representing £53,000,000 of invested capital. Tramways had materially helped the solution of one of the great problems of democracy—getting the people from the slums to the suburbs, and he saw no reason why motor 'buses should not further assist that work.

Alderman H. LINSLEY (Salford), vice-president of the Association, acknowledged the toast.

UNFAIR CHARGES FOR TRACK PAVING.

The paper read on Wednesday afternoon was "The Maintenance of Paving on Tramway Track as affected by Section 28 of the Tramways Act, 1870," by Councillor Wm. C. FENTON, member of the Sheffield City Council. Mr. Fenton set forth very clearly the unfairness of the charges put upon urban tramway undertakings in the matter of rates, up-keep of road paving and road widenings; and illustrated his contention by figures taken from some of the largest undertakings. To these he added the number of workmen carried at non-paying fares—fares, indeed, with which no other present mode of transport can compare. He summed up the case for the tramways in a striking if rather quaint way: "Dealing with the question on its merits," he said, "we might repeat the old Latin phrase, 'Let justice be done if the heavens fall,' and although this is a contingency which may hardly be expected to happen, the sentiment is one which may well express the feelings of all just and upright men of sound judgment and reasonable opinion." The arguments for and against the repeal or revision of Section 28 of the Act of 1870 were summarised in twelve reasons given for such revision. Seven objections to such revision were answered categorically, and in conclusion the author gave five suggested remedies whereby the present inequitable conditions might be improved if they could not be abolished.

Councillor C. F. SPENCER (Halifax) commented on the injustice of the section of the 1870 Act. Municipal tramways were rated on their ability to pay; but the basis of rating under private ownership of, say, a factory, was in no way altered by an increase of business profits. Tramways paid practically the whole cost of the upkeep of narrow streets and other users paid nothing; he thought an equitable proportion would be for tramways to pay for maintenance between the tracks and nine inches on either side. He did not think the Road Board were warranted in hoarding up their funds for posterity; he believed the Board had about £3,000,000 so invested.

Alderman J. TRUMBLE (Croydon) said the proposal to tax 'buses would lead to serious difficulties; how could they differentiate between a 'bus and a commercial van?

Mr. W. J. SQUIRES (London County Council) expressed the confident belief that, given equal treatment to the 'bus companies, tramway undertakings would hold their own for all time. 'Bus companies should contribute towards road maintenance and rating.

Mr. W. J. HADFIELD (highways surveyor, Sheffield) said the city had no cause for complaint against the Road Board, from whom they had received altogether £30,000.

Mr. W. SMITH-SAVILLE (borough engineer, Darwen) said that since the advent of heavy motor traffic their main roads had cost £881 per mile as against £342 previously.

The discussion was also contributed to by the Mayor of Rochdale (Alderman Cunliffe), Bailie Alston, Mr. J. B. Hamilton, Judge Hall (Leith), Mr. H. Mozley (Burnley), and Mr. H. M Sayers (Tramways and Light Railways Association).

Mr. HARRY ENGLAND (Tramways and Light Railways Association) pointed out how serious the question had become in industrial areas, owing to the rapid growth of heavy motor traffic. He suggested that the Tramways Act of 1870 as a whole required revision. The Tramways and Light Railways Association had determined to make a strong effort to obtain such new legislation as would simplify and cheapen the method of obtaining concessions for new tramways, and thus enable the public to secure advantages urgently required, and he urged that the Executive Committee of the Municipal Tramways Association should co-operate with the other association.

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Mr. C. J. SPENCER (hon. secretary) explained that at the July meeting of the Association a resolution was passed instructing the Executive to take such steps as will result in more equitable legislation with regard to the whole question of road maintenance, and to act if necessary with other associations.

URBAN PASSENGER TRANSPORT.

On Thursday morning a paper by Mr. J. B. HAMILTON, general manager Leeds Corporation tramways, dealt with "Urban Passenger Transport." The author epitomised the position in two sentences: "The motor 'bus has seven times the number of fatal accidents per vehicle per annum and twice as many injuries per million passengers as compared with tramways. Its obstructive street condition in fine weather is as two 'buses to one tramcar, and in inclement weather as four 'buses to one tramcar, whilst the cost to a municipality of providing transit by motor 'buses is double the amount per seat provided by electric tramways." In seven appendixes four comparative statements were given showing the results of operation in 27 towns of over 150,000 in population, as compared with the result assuming transport was effected by means of motor 'buses. The author also gave a diagram of the actual operating conditions of tramway service, and an estimate of motor omnibus service on the supposition that the latter had an earning capacity of 80 per cent. of a tramcar: in this the drop in the number of passengers carried at certain times compared with the seating capacity of the vehicles was clearly due to what might be termed "return empties" during and following rush hours. After enumerating the many and ever-increasing advantages that had followed the introduction and working of tramways, Mr. Hamilton took up the question of motor 'bus competition. At present these vehicles could not take the place of tramways, which would only give way to some system superior to them in every respect. The opinions of Lord Montagu and of Mr. Worby Beaumont were brushed aside. As to the latter—"it seems as if all his arguments were like his roads—to be merely composed of good surface." Mr. Fenton's excellent paper was quoted as showing that a very large proportion of the commercial and general traffic was carried on the portions of the road used by the tramcars. A careful perusal of Mr. Pott's paper at the Tramways and Light Railways Association led Mr. Hamilton to this conclusion; that the author "accords to the motor 'bus a position to which it is not justified on financial results on account of the present higher prices of petrol and the want of a provision for depreciation." The 27 towns treated in the appendix had an aggregate revenue of over 7¾ millions earned by some 4,000 cars at work out of about 5,700; giving an annual revenue per car of £1,594. The total expenses of over £5,600,000, and the total mileage of about 146,811,000, gave an average cost per mile for expenses of 9.167d. on 36,740 miles a year per car. The average cost per car per annum was therefore £1,403, leaving a surplus of £291. Taking Leeds as a sample about 75 per cent. of the rates was for lines and 25 for buildings, or £59 per vehicle for the former. After careful consideration the amount which clause 28 imposed on tramways was found to be £61 per car every year. To the surplus of £291, £120 should be added in rates paid in maintenance of roads for the general benefit of the towns. After explaining how he arrived at 80 per cent. as the earning capacity of the 'bus as compared with the car, Mr. Hamilton gave his reasons for quoting 10d. per car mile as the cost of running motor 'buses (exclusive of London) which would give a deficit of £176 per annum on each omnibus; this deficit would be increased by £38 if the cost of "extraordinary" traffic be imposed on them. From this the petrol tax of £31 should be deducted, leaving a net deficit of £183. Applying these figures to the 27 towns an annual loss of £914,085 would result from the substitution of the 'bus for the car. Moreover, "the annual cost per seat in the case of tramways was £23 as against £45 in the omnibus." As to railless traction, "the total cost of operation, under ordinary conditions, is at least 20 to 25 per cent. less per car mile than that of motor 'buses"; the vehicles were entirely free from smell, and did not easily skid. This form of traction could not, except under special circumstances, be substituted for tramways where traffic was heavy, but as a feeder to the latter it compared favourably with the motor 'bus. The higher costs of operation and general disadvantage in connection with petrol motor 'buses applied equally to petrol-electric, storage battery, steam, etc., vehicles. Petrol-driven tramcars on the other hand "may be found most useful where it is undesirable to erect overhead wires; but the costs of operation, which must be higher than where electricity is the traction force, are not yet established."

Alderman H. W. LITTLER (West Ham) opened the discussion, and he was followed by Mr. WORBY BEAUMONT, technical adviser to the Commissioner of Police, who thanked the Council for inviting him to be present. He declared that he had never said tramways were to be regarded as "back numbers." For many places they were the best means of transit, but he also knew of many other places where they were not the best means. To give figures relating to the running of 3,000 'buses in London would be misleading to people interested in the running of perhaps 30 'buses in any other place.

Other speakers included Alderman F. Smith (Liverpool), Mr. A. Baker (Birmingham), Mr. Heather (Leyton), Alderman Trumble, and Mr. C. J. Spencer. Thanks were accorded to Mr. Hamilton, who undertook to reply to the criticisms in writing.

ELECTION OF OFFICERS.

The annual business meeting of the Association was held yesterday morning, when the following officers were elected for the ensuing year:—President, Alderman H. Linsley, chairman of Salford Tramways Committee; vice-president, Mr. P. Fisher, general manager, Dundee Corporation Tramways; members of Council, Mr. A. L. C. Fell, chief officer, London County Council Tramways; Mr. J. B. Hamilton, general manager, Leeds City Tramways; Mr. G. W. Holford, general manager, Salford Corporation Tramways; and Mr. J. H. Rodgers, chairman, Newcastle-on-Tyne Tramways Committee; auditor, Mr. W. J. McCombe, general manager, Hull Corporation Tramways. Mr. C. J. Spencer, general manager, Bradford Corporation Tramways, was re-elected hon. secretary.

## MISCELLANEOUS NEWS AND NOTES.

**Increased Speed at West Ham.**—The Board of Trade have consented to an increase of the maximum speeds on the West Ham tramways.

**A Swansea Extension Scheme.**—The Light Railway Commissioners have approved of the project for the construction of a tramway up Town Hill by the Corporation for the development of their estate.

**Aberdare Railless Traction System.**—A trial run in connection with the Cedes-Stoll railless trolley installation at Aberdare, which is to be managed for the Urban Council by Mr. Abraham, was made on September 22. Mr. Rudman, representing Mr. S. Sellon, consulting engineer to the Council, was present.

**Dublin Employees Fined for Leaving Cars.**—At the police court on September 23 fifteen conductors and ten ex-motormen who took part in the futile strike were each fined 5s. for leaving tramcars unattended in the streets, in violation of a by-law of the Tramways Company. During the week a number of attacks have been made on police-escorted tramcars.

**Croydon Council Demand Traffic Legislation.**—On September 22 Croydon Corporation passed a resolution urging the Government speedily to legislate upon the lines of the recommendations of the Select Committee on Motor Traffic, owing to the dangerous and congested state of the streets, the serious accidents and loss of life, through the influx of motor 'buses. It was stated that five persons have been killed in Croydon this year by these vehicles, but none by tramcars.

**Lancashire Tramways Goods Carrying Scheme.**—Conferences on the matter of carrying goods have recently been held between the South Lancashire Tramways Company and the Manchester, Salford, and Liverpool Tramways Committees, and there is every probability that before long a scheme will be proposed by which it will be possible for goods to be loaded on specially-built tramcars in the vicinity of the Liverpool docks and conveyed during the night to Manchester and other parts of Lancashire. In order to provide for prompt distribution it is proposed to create depôts at different points, and from those depôts to distribute the traffic in adjoining areas by means of motor lorries.

## CONTRACTS AND ORDERS.

**Tudor Accumulator Company** have received an order for welding joints on the Newport (Mon.) tramways.

**Leyland Motors, Limited,** have received a contract to supply a motor tower wagon to Preston Tramways Committee, at £735.

**Prahran and Malvern (Victoria) Tramways Trust** have allotted a contract to Duncan and Fraser (Adelaide) for 10 car bodies, at £815 each.

**More P.A.Y.E. Cars for Leicester.**—The Corporation have given an order for 10 additional cars on the P.A.Y.E. system, and further purchases of cars of this type are in contemplation.

**Swindon Council** have placed contracts with the Davenport Engineering Company for a cooling tower, at £685, and with the Kennicott Water Softener Company for water softening plant, at £558.

**Belfast Tramways and Electricity Committee** have placed contracts with Callender's Cable Construction Company for the supply of cable, and with the British Thomson-Houston Company for the supply of switchgear.

**Melbourne City Council** have accepted the following tenders:—British General Electric Company, spare armature for 500 kw. motor-generator, £200; British Insulated and Helsby Cables, insulated copper cables, £1,361 5s.; and Dalgaty and Co., two Tangye's suction gas engines, £1,270.

**The Albion Motor Car Company, Limited,** have received an order from the South African Government Railways for twevle 32 h.p. Albion vehicles. This is the largest order ever placed by the South African Government, and is the result of the previous satisfaction they have had with the Albion vehicles which they purchased some years ago.

**E. Bennis and Co., Limited,** have received the following orders:—Mersey Railway Company power station, Birkenhead, two chain grate stokers; Keighley Electricity Works, two stokers and self-cleaning compressed air furnaces (repeat order); Bexley Heath Urban Council electricity and tramways department, two self-cleaning compressed air furnaces; Stirling electricity works, four stokers and self-cleaning compressed air furnaces.

**Glasgow Tramways Committee** have accepted tenders as subjoined:—B.I. and Helsby Cables, Limited, section pillar switches; J. Macmillan and Co., telephone switchboard for head office; P. R. Jackson and Co., Limited, Westinghouse commutators; Dewrance and Co. and Hopkinson and Co., valves for Pinkston power station; R. R. Todd, copper bonds; Lux Lamp Company, Limited, lamps. The Electricity Committee on Works have recommended for acceptance the following tenders:—British Westinghouse Company, Limited, two sets of 500 kw. size, £2,573; Siemens Bros. Dynamo Works, Limited, two sets of 250 kw. size, £1,787.

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## PERSONAL.

**Mr. A. M. Little** has been retained as an expert adviser to the Mumbles Railway Company, in the matter of the electrification of the lines from Swansea to the Mumbles.

**Mr. F. Eggington,** principal assistant in charge of the West Ham tramways, has been granted a gratuity of £20 for extra services rendered since Mr. H. E. Blain resigned the managership.

**Mr. T. B. Moseley** has been presented with an oak bureau and bookcase by the staff and employees of Bradford tramways, on the occasion of his marriage. The tramways band made him a gift of a barometer.

**Sir Maurice Fitzmaurice,** late engineer to the London County Council, has been appointed by the Commonwealth Government to report upon the question of constructing naval bases for the Australian naval unit.

**Hobart Tramways Officials.**—It was mentioned at the August meeting of the Hobart (Tasmania) Council that the authority had had possession of the tramways for six weeks. Denial was given to a rumour that Mr. Parker, the manager, and Mr. C. B. Davies, the engineer, had had their salaries raised by the company just before the Corporation took over the undertaking. Alderman Amott stated that Mr. Davies was the last to receive an increase of salary, and that was over 18 months ago.

**Plymouth Management.**—Commenting on the annual report of Mr. C. R. Everson, the tramways manager, presented at a meeting of the Tramways Committee on September 21, the "Western Daily Mercury" says:—"The tramways relieved the rates by a penny, and spent out of revenue £4,300 on renewals and repairs. The liquidation of the loan capital is proceeding at a rapid rate. In the meantime, the success of the enterprise grows. Already the gross receipts for the current year are up by a thousand pounds. This is a tribute to good management, and a complete answer to the critics, who have never been able to conceal their hostility to municipal tramways."

**Mr. Leonard Johnston,** the new manager of the Southampton tramways, the local "Echo" is informed, effected a saving of £500 per annum by re-organising the work in the depôt whilst manager of the Blackburn tramways. At the time of his appointment the department was losing £5,000 per annum, but at the time of his resignation the balance-sheet showed a nett profit of £1,400. At Gloucester, during his first year of office, he saved £1,400 in operating expenses by re-organisation, and while the system was under his control the receipts increased by £2,000 per annum. The operating costs of 5.2 pence per car mile are among the lowest in the country. During the last two years of his managership at Gloucester, Mr. Johnston reduced the cost of current by £1,300. The consumption of .71 unit per car mile is claimed to be by far the lowest in the country. Mr. Johnston was for nine years engaged on the construction of tramway systems.

**Mr. William M. Murphy,** chairman of the Dublin United Tramways Company, is referred to by a Dublin correspondent of the "Manchester Guardian" as "formerly a Nationalist member for the city, and as owner of one of the Nationalist newspaper organisations. He is an intimate friend and follower of Mr. Timothy Healy. His commercial interests are unusually various and widespread. A railway contractor whose concern extends from South Clare to West Africa, a tramway constructor and director with interests in Lancashire and Kent as well as Dublin, hotel proprietor, newspaper proprietor, draper,' his career is a rather ironical comment on the theory that all the wealth and business talent of Ireland belong to the classic minority. Mr. Murphy is fighting the strike with all the cold determination that Lord Davenport displayed against the London dockers." Mr. Murphy has written to a London newspaper denying a statement that "he knew he carries his life in his hands," and adding that he passes every day through the streets without fear or apprehension of his personal safety, and without insult, or without having an angry word addressed to him. "It is not true to say that I have persuaded other employers to the course they have adopted. They are following my example, but not my lead, as I have no pretence to leadership. I am responsible only for my action in connection with the undertakings that I control."

**Mr. James Ross,** engineer, railway contractor and financier, whose death is announced at Montreal, went to the United States from Scotland in 1868. Along with Sir William Mackenzie he acquired the tramway systems of Birmingham (England), and formed the City of Birmingham Tramways Co., 1896. He was also interested in several electric traction and electricity supply undertakings in Canada and other countries.

## FINANCIAL REPORTS AND MEETINGS.

**Southport Tramway Deficit.**—The annual report of the Borough Treasurer shows that there was a deficit of £1,651 last year on the Corporation tramway undertaking. There was a net profit of £13,988 on gas, and of £1,362 on electricity.

**The British Electrical Federation.**—The traffic statement for the week ended September 19, 1913, shows that the receipts from tramways and railways amounted to £41,188, as compared with £39,586 in the corresponding week last year, and from omnibuses £12,805, as compared with £826, making a total of £53,993, as compared with £40,412. The tramway and railway route mileage was 429.82, as compared with 431.52. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working, both last year and this year, the receipts show an increase of £2,127 upon the week.

**Melbourne Tramway and Omnibus Company.**—The directors report that the balance shown after paying 3s. per share in dividends and bonuses for the year, and including £95,991 brought forward from last year, is £202,754. From this they propose to pay a final bonus of 1s. per share, £48,000; to carry to reserve for return of capital, making it £480,000, £105,741, leaving to carry forward £49,013. The traffic receipts for the year to June 30 improved by £34,181, and 4,284,810 more passengers have been carried than during the previous year. The negotiations for the sale of the company's business to the Government that were in progress at the time of the last report ultimately lapsed. For the quarter ending September 30 the directors announce a dividend of 6d. per share and also a bonus of 6d. per share.

## COPPER AND ALUMINIUM MARKET.

September 26, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, Sept. 26. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 72 10 0 .. | 74 2 6 .. | 79 0 0 |
| ,, (three months) .. .. | 72 7 6 .. | 73 17 6 .. | 80 0 0 |
| Electrolytic Copper—bars or ingots .. | 77 15 0 .. | 78 0 0 .. | 82 0 0 |
| Aluminium—bars or ingots .. .. .. | 86 10 0 .. | 86 10 0 .. | 79 0 0 |

## COAL MARKET.

September 26, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, Sept. 26. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 .. | 25 0 .. | 22 9 .. | 21 0 |
| Best Seconds .. .. | 23 9 .. | 23 9 .. | 22 0 .. | 20 3 |
| Ordinary Drys .. .. | 21 0 .. | 21 0 .. | 20 3 .. | 19 3 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 6 .. | 18 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 0 .. | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 .. | 20 6 .. | 17 3 .. | 17 0 |
| Best Seconds .. .. | 19 3 .. | 19 3 .. | 16 6 .. | 16 0 |
| Ordinary Drys .. .. | 16 6 .. | 16 6 .. | 14 9 .. | 15 3 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 14 6 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 14 9 .. | 14 9 .. | 13 0 .. | 11 6 |
| Best Seconds .. .. | 13 6 .. | 13 6 .. | 12 6 .. | 9 10½ |
| Smalls .. .. .. | 8 3 .. | 8 6 .. | 10 0 .. | 5 3 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Sept. 21 | £53,290 | £56,944 | 38 | (2,100,690 | +(175,757 |
| Auckland..... (14 days) | Aug. 29 | 18,602 | 19,543 | 9 | 41,610 | + 1,150 |
| Ballarat and Bendigo | Aug. 10 | 847 | 788 | 19 | 16,722 | — 249 |
| Brazilian St. Rly. Mlrs | August | 40,419 | 50,402 | 4 | 50,402 | + 9,983 |
| Brazilian Traction..... | Sept. 20 | 86,201 | 93,973 | 38 | 3,394,652 | + 479,208 |
| Brisbane ..... | August | 27,680 | 29,970 | 34 | 207,178 | + 48,784 |
| British Columbia ..... $ | June | 498,306 | 543,186 | 52 | 6,812,309 | +1,062,660 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacroze . | August | 41,677 | 44,462 | 8 | 89,684 | + 6,009 |
| Calcutta.....Rs. | Sept. 20 | 65 414 | 81,096 | 38 | 24,46,296 | + 1,36,297 |
| Cape Town ..... | July | 10,875 | 11,417 | 30 | 86,900 | + 5,182 |
| Carthagena & Herreria. | August | 2,151 | 2,192 | 34 | 23,317 | + 6,983 |
| East India ..... | August | 1,922 | 2,005 | 4 | 2,005 | + 83 |
| Kalgoorlie..... | August | 3,887 | 3,337 | 34 | 23,379 | — 2,158 |
| La Plata..... | August | 3,601 | 4,641 | 8 | 40,983 | + 9,040 |
| Lima..... | August | 31,828 | 33,900 | 34 | 266,537 | + 12,343 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Sept 15 | 26,776 | 29,097 | 26 | 459,302 | + 33,976 |
| Melbourne ..... | July | ... | 59,000 | 30 | 439,500 | ... |
| Mexico .....$ | August | 578,638 | 635,445 | 34 | 4,511,557 | + 90,689 |
| Montevideo..... | August | 26 249 | 28,829 | 34 | 316,431 | + 26,324 |
| Para ..... | Sept. 21 | 3,834 | 3,622 | 42 | 168.120 | + 1,227 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | July | 3,126 | 3,256 | 30 | 25,127 | + 6,662 |
| Shanghai .....$ | Sept 17 | 20,265 | 24,800 | 37 | 808,452 | + 89,453 |
| Singapore .....$ | Sept. 20 | 10,296 | 12,439 | 38 | 452,409 | + 57,133 |
| Toronto .....$ | June | 696,980 | 815,208 | 26 | 4,655,486 | + 642,767 |
| Winnipeg.....$ | June | 300,402 | 321,037 | 26 | 1,972,374 | + 163,671 |

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Complete Equipment
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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Sept. 17 | £1,606 | £1,644 | + £38 | 16 | £27,759 | + £1,792 |
| Ayr Corporation ..... | ,, 20 | 680 | 932 | + 252 | 18 | 9,546 | + 1,202 |
| Bath Electric ..... | ,, 17 | 1,127 | 1,113 | — 14 | 38 | 37,535 | + 2,838 |
| Birkenhead Corp. ..... | ,, 21 | 1,183 | 1,314 | + 131 | 25 | 32,565 | + 3,177 |
| Birmingham Corp. ..... | ,, 20 | 10,888 | 12,216 | + 1,328 | 25 | 286,089 | + 21,576 |
| Blackburn Corporation | ,, 17 | 1,291 | 1,281 | — 30 | 25 | 33,656 | + 3,104 |
| Blackpool & Fleetwood | ,, 20 | 1,250 | 1,585 | + 335 | 12 | 23,533 | + 3,815 |
| Blackpool Corporation | ,, 18 | 2,612 | 3,005 | + 453 | 24 | 62,597 | + 9,653 |
| Bolton Corporation ..... | ,, 21 | 2,636 | 2,780 | + 144 | 25 | 69,065 | + 3,771 |
| Bournemouth Corp. ..... | ,, 24 | 2,055 | 2,387 | + 332 | 25 | 59,096 | + 6,903 |
| Bradford Corporation... | ,, 20 | 5,774 | 5,743 | — 31 | 25 | 150,248 | + 9,143 |
| Brighton Corporation.. | ,, 21 | 1,110 | 1,254 | + 144 | 25 | 30,671 | + 1,837 |
| Bristol ..... | ,, 19 | 7,775 | 9,279 | + 1,504 | 37 | 304,842 | + 42,838 |
| British Elec. Federatn. | ,, 19 | 40,412 | 53,393 | * | ... | ... | ... |
| Burnley Corporation .. | ,, 20 | 1,678 | 1,660 | — 18 | 25 | 43,175 | + 5,846 |
| Burton-on-Trent Corp. | ,, 21 | 282 | 295 | + 31 | 25 | 7,366 | + 300 |
| Bury Corporation..... | ,, 21 | 1,413 | 1,419 | + 6 | 25 | 31,463 | + 1,209 |
| Cardiff Corporation..... | Aug. 23 | 2,600 | 2,956 | + 356 | 21 | 58,075 | + 6,350 |
| Chatham and District.. | Sept. 18 | 908 | 1,031 | + 123 | 37 | 34,571 | + 1,913 |
| Chesterfield Corp. ..... | ,, 11 | 213 | 256 | + 43 | 23 | 6,151 | + 787 |
| Colne & Trawden..... | ,, 20 | 291 | 268 | — 23 | 38 | 10,490 | + 698 |
| Cork Electric..... | ,, 18 | 518 | 501 | — 17 | 37 | 18,758 | + 294 |
| Croydon Corporation ... | ,, 12 | 1,753 | 1,641 | — 111 | 23 | 39,836 | — 4,683 |
| Darlington Corporation | ,, 20 | 222 | 250 | + 28 | 25 | 6 270 | + 639 |
| Derby Corporation ..... | ,, 20 | 947 | 965 | + 18 | 25 | 24,954 | + 2,603 |
| Dover Corporation ..... | ,, 20 | 255 | 275 | + 20 | 25 | 6,783 | + 48 |
| Dublin & Lucan ..... | ,, 19 | 173 | 119 | — 54 | 11½ | 2,071 | + 109 |
| Dublin United ..... | ,, 19 | 5 888 | 3,162 | — 2.726 | 37 | 217,078 | — 3,842 |
| Dundee City ..... | ,, 17 | 1,861 | 1,909 | + 48 | 18 | 24,049 | + 1,814 |
| East Ham Corporation | ,, 20 | 1,048 | 984 | — 64 | 25 | 25,583 | — 1,075 |
| Exeter Corporation ..... | ,, 19 | 363 | 369 | + 6 | 25 | 9,022 | + 370 |
| Gearless Motor 'Buses. | ,, 20 | .... | 605 | ... | 24 | 11,444 | ... |
| Glasgow Corporation ... | ,, 20 | 20,141 | 20,873 | + 732 | 16 | 318,059 | + 21,998 |
| Glossop(U.Elec.Supply) | ,, 20 | 139 | 142 | + 3 | 38 | 4,938 | + 544 |
| Halifax Corporation ... | ,, 16 | 2,128 | 2,163 | + 35 | 24 | 53,196 | + 1,102 |
| Hastings & District..... | ,, 18 | 1,339 | 1,348 | + 9 | 38 | 40.692 | + 2,872 |
| Huddersfield Corp. ..... | ,, 20 | 2,097 | 2,048 | — 49 | 25 | 53,871 | + 3,356 |
| Hull Corporation ..... | ,, 20 | 2,910 | 3,127 | + 217 | 25 | 76,243 | + 3,644 |
| Ilford U.D.C. ..... | ,, 20 | 417 | 445 | + 28 | 25 | 11,474 | — 1,554 |
| Ilkeston Corporation ... | ,, 24 | 122 | 139 | + 16 | 26 | 3,461 | + 534 |
| Ipswich Corporation ... | ,, 13 | 471 | 568 | + 97 | 24 | 11,815 | + 321 |
| Isle of Thanet l..... | ,, 20 | 930 | 1,076 | + 93 | 51 | 35,636 | + 1,824 |
| Kilmarnock Corp. ..... | ,, 20 | 169 | 177 | + 8 | 18 | 3.361 | + 249 |
| Lanarkshire ..... | ,, 18 | 1,736 | 1,673 | — 63 | 37 | 62,389 | + 7,434 |
| Lancashire United ..... | ,, 17 | 1,470 | 1,736 | + 266 | 37 | 57,242 | + 6,404 |
| Leeds City ..... | ,, 20 | 8,061 | 8,605 | + 544 | 25 | 203,584 | + 13,905 |
| Leicester Corporation... | ,, 20 | 2,614 | 2,828 | + 214 | 38 | 105,684 | + 9,789 |
| Leith Corporation ..... | ,, 20 | 715 | 706 | — 9 | 18 | 18,603 | + 400 |
| Liverpool Corporation.. | ,, 20 | 12,193 | 12,934 | + 726 | 37½ | 486,206 | + 36,262 |
| Llandudno & Colwyn B. | ,, 19 | 444 | 515 | + 71 | 42 | 15,551 | + 1 368 |
| London County Council | ,, 17 | 40,018 | 43,339 | + 2,321 | 24 | 1,019,065 | — 16,898 |
| London Gnl. Omnibus.. | ,, 20 | 60,047 | 62,763 | + 2,716 | 38 | 2,336,144 | + 461.031 |
| London United ..... | ,, 19 | 6,316 | 6,707 | + 391 | 38 | 240,170 | + 1,914 |
| Lowestoft Corporation | ,, 20 | 239 | 280 | + 41 | 50 | 11,026 | + 507 |
| Maidstone Corporation | Aug. 14 | 205 | 212 | + 7 | 21 | 4,147 | + 204 |
| Manchester Corp. ..... | Sept. 20 | 16,983 | 17,227 | + 244 | 25 | 439,746 | + 21.632 |
| Met. Elec. Trys. ..... | ,, 19 | 8,824 | 9,468 | + 644 | 38 | 343,243 | + 9,067 |
| Nelson Corporation..... | ,, 20 | 208 | 189 | — 19 | 23 | 5.411 | + 338 |
| N'castle-on-Tyne Corp. | ,, 20 | 4,439 | 4,853 | + 414 | 25 | 119,893 | + 10,432 |
| Newport (Mon.) Corp.... | ,, 20 | 721 | 804 | + 83 | 25 | 19.216 | + 1,415 |
| New St. Helens & Dist... | ,, 17 | 768 | 828 | + 60 | 12 | 10,763 | + 1.334 |
| Northampton Corp ..... | ,, 19 | 547 | 597 | + 50 | 24½ | 14,699 | + 710 |
| Nottingham Corp. ..... | ,, 18 | 3,138 | 3,395 | + 257 | 24½ | 81,932 | + 3,133 |
| Oldham Corporation ... | ,, 21 | 2,099 | 2,217 | + 118 | 26 | 57,454 | + 3,456 |
| Portsmouth Corp..... | ,, 20 | 2,283 | 2,440 | + 152 | 25 | 61,609 | + 2,924 |
| Preston Corporation ... | ,, 10 | 810 | 863 | + 53 | 24 | 21,493 | + 1,131 |
| Provincial ..... | ,, 20 | 2,047 | 2,187 | + 140 | 51 | 98,052 | + 6,636 |
| Reading Corporation .. | ,, 18 | 658 | 690 | + 32 | 24 | 17,310 | + 1,089 |
| Rochdale Corporation | ,, 20 | 1,587 | 1,562 | — 25 | 25 | 40,868 | + 1,583 |
| Rotherham Corp. ..... | ,, 24 | 750 | 1,015 | + 265 | 25 | 25,181 | + 6,547 |
| Salford Corporation ... | ,, 22 | 5,066 | 5,159 | + 93 | 25 | 132.024 | + 4 741 |
| Sheffield Corporation... | ,, 21 | 6,833 | 7,357 | + 524 | 26 | 183,052 | + 16.867 |
| Southampton Corp..... | ,, 17 | 1,353 | 1,451 | + 98 | 24 | 33,533 | + 1,490 |
| Southend-on-Sea Corp. | ,, 3 | 1,116 | 1,483 | + 320 | 23 | 24,483 | + 3,617 |
| South Met. Trys. ..... | ,, 19 | 887 | 1,200 | + 313 | 38 | 33.889 | + 1,507 |
| South Shields Corp..... | ,, 20 | 685 | 701 | + 16 | 25 | 18,512 | + 2,458 |
| Sunderland Corp. ..... | ,, 21 | 1.369 | 1.475 | + 106 | 25 | 37,290 | + 4 090 |
| Sunderland District ... | ,, 17 | 523 | 541 | + 18 | 46 | 25,311 | + 4.510 |
| Swindon Corporation ... | ,, 17 | 168 | 172 | + 4 | 24 | 4,146 | + 298 |
| Trys. (M.E.T.) 'Buses | ,, 20 | ... | 8,923 | ... | 34 | 152,462 | ... |
| TynesideTrys.&Tmrds | ,, 17 | 551 | 513 | — 38 | 12 | 6.414 | + 493 |
| Wallasey Corporation | ,, 20 | 1,121 | 1,186 | + 65 | 25 | 32 164 | + 2 880 |
| Walsall Corporation ... | ,, 20 | 604 | 627 | + 23 | 38 | 23,498 | + 1,603 |
| Walthamstow U.D.C.... | ,, 20 | 681 | 744 | + 63 | 25 | 19,201 | — 107 |
| Warrington Corp ..... | Aug. 28 | 431 | 428 | — 3 | 22 | 9,619 | + 331 |
| West Ham Corporation | Sept. 10 | 2,591 | 2 701 | + 110 | 24½ | 67,307 | + 1.764 |
| Wigan Corporation ..... | ,, 18 | 1,369 | 1,461 | + 92 | 24½ | 36,235 | + 3,764 |
| Wolverhampton Corp | ,, 21 | 1 003 | 1.072 | + 69 | 26 | 27.894 | + 1.562 |
| Yorkshire (W. Riding | ,, 21 | 1,394 | 1,465 | + 71 | 38 | 55,033 | + 5,907 |

* From such of the services as were working both last year and this year the receipts show an increase of £3,127 upon the week.

# ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Sept. 20 | £4,783 | £4,433 | — £300 | 38 | £192,891 | + £9,594 |
| City and South London | ,, 20 | 2,738 | 2,607 | — 131 | 38 | 105.864 | — 9,881 |
| Liverpool Overhead..... | ,, 21 | 1,633 | 1,730 | + 97 | 38 | 65.357 | + 5,088 |
| London Electric..... | ,, 20 | 12,433 | 12.893 | + 460 | 38 | 514.795 | + 4 275 |
| Mersey ..... | ,, 20 | 2 278 | 2,320 | + 42 | 38 | 84.553 | + 4.999 |
| Metropolitan ..... | ,, 21 | 16,552 | 17.942 | + 1,390 | 38 | 647.572 | + 16,770 |
| Metropolitan District.. | ,, 20 | 12,250 | 12,687 | + 437 | 38 | 490,426 | + 18,619 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, September 26. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 74 — 77 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅛ — 4⅜ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅜ — 4½ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 92 — 94 |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 96 — 98 |
| 100 | Do. 5% Deb. Stk. Red..... | ... | 98½ —100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅞ — ⅞ |
| 1 | Do. 5% Cum. Pref ..... | ... | ⅞ — ⅞ |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | — 2 | 70 — 75 xd |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 1¼ | 96 — 97 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 7½ — 7½ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 99 —102 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6¼ |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¾ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —103 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stk. | — 1 | 125 —128 |
| 100 | Do. Pref. Ord. Stock ..... | — ½ | 113½ —115½ |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 103 —106 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. ..... | ... | 94 — 96 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 84 — 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... | + 1 | 49 — 53 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | + ¼ | 12 — 14 |
| 100 | Do. Deferred Ord. Stock ..... | ... | 4½ — 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | — 2 | 92 — 95 xd |
| 100 | Do. 4½% Second Debenture Stock, Red ... | ... | 76 — 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | + ¼ | 6 — 6½ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ⅞ — ⅞ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3½ |
| 100 | Do. 5% Debs., Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5⅛ — 5⅜ |
| 100 | Do. 4% Debentare Stock Red, 1965 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. .... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | — ¼ | — 10¼ |
| 10 | Do. do. 6% Pref. ..... | — ⅛ | — 11⅛ |
| 100 | Do. do. "A" Red. ..... | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79¾ |
| 10 | Gateshead & Dist. Trys. Co., Ord. ..... | — ¼ | 8⅝ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | ⅞ — 1 |
| 1 | Do. do. 6% Cum. Pref. ..... | — 1/32 | ¾ — ⅞ xd |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | — 2 | 66 — 71 " |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | ... | 94½ — 98⅛ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3½ — 4¼ |
| 10 | Do. do. 6% Cum. Pref..... | ... | 6½ — 7 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 79 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | — 1/16 | 2 1/16 — 2 3/16 |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 7/16 — 9/16 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | — 1/32 | ⅞ — 1 |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. ..... | ... | 76 — 78 |
| 1 | Lisbon Electric Trams., Lim., Ord. ..... | ... | 1 — 1¼ |
| 1 | Do. 6% Cum. Pref. ..... | .. | 1⅛ — 1 1/16 |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — ⅜ |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 96 — 98 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | — 1 | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref..... | — 1/8 | 4¼ — 5 xd |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | — 2 | 109 —112 xd |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 3/32 — 1 3/32 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red. ... | ... | 83 — 86 |
| 100 | Do. 5% Deb. Stock, Red. ... | — 2 | 87 — 90 xd |
| $100 | Mexico Tramways Co., Common Stock ..... | — 8½ | 68 — 93 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | + ½ | 91 — 93 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | ... | 93½ — 95½ |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1923) ... | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. ..... | ... | 1 1/16 — 1 3/16 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6¼ — 6½ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5⅝ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6 — 6½ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. ..... | ... | 1⅛ — 1¾ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 29/32 — 33/32 |
| 1 | Do. 5% Cum. Pref. ..... | ... | 29/32 — 31/32 |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim., Ord. ..... | ... | 31/32 — 1 1/32 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5 %... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5⅛ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 85 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | + ½ | 102½ —103½ |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | + ½ | 97¼ — 98½ |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 100 —103 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1939 ..... | ... | 102½ —104½ |
| 10 | Shanghai Elec. Construction Co. ..... | + ¾ | 9¼ — 10¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 85 — 89 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅛ — ¼ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 68 — 72 |
| ... | Southern Elec. Trs. Co. of B.A., 5% 1st Mrt. Debs. .... | ... | 93 — 96 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds .... | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 87 — 89 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83¾ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord. ..... | ... | 4⅝ — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4 1/16 — 5 1/16 |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ —100½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅛ — ⅜ |
| 5 | Do. do. 6% Cum. Pref..... | ... | 3⅛ — 3⅜ |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 17. ] LONDON, SATURDAY, OCTOBER 4, 1913. [ Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### CARDIFF CITY TRAMWAYS.

The Cardiff Corporation invite tenders for the supply of Passenger Tickets and Ticket Punches over a period of years commencing as and from January 1 next, 1914. Full particulars can be obtained on application to Mr. Arthur Ellis, Manager, Central Offices, The Hayes, Cardiff. Tenders to be endorsed "Tenders for Tickets and Punches for Tramways," and to be delivered at my Office not later than the first post on Friday, October 17, 1913.

J. L. WHEATLEY,
Town Clerk.

City Hall, Cardiff.

### COUNTY BOROUGH OF CROYDON.

SUPPLY OF TWO PETROL MOTOR FIRE ENGINES AND ONE MOTOR WAGON.

Notice is hereby given that the Council are prepared to receive tenders for the supply of Two Petrol Motor Fire Engines and One Motor Wagon for their Fire Brigade.

Forms of tender and conditions may be obtained on application at the Borough Engineer's Office, Town Hall, Croydon. Tenders will only be received subject to Draft Contract and conditions deposited at my office, which may be inspected during office hours.

Tenders, on the prescribed form, must be sent to me by 12 noon on Monday, the 13th day of October, 1913, endorsed "Tender for Motor Fire Engines, etc."

The Council will not be bound to accept the lowest or any tender.

JOHN M. NEWNHAM,
Town Clerk.

Town Hall, Croydon,
September 26, 1913.

### CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation invite tenders for the supply, delivery, and erection of the following:—

(*a*) One 1,800-2,000 kw. Motor Converter or Rotary Converter and Static Transformers.
(*b*) High Tension Switchboard.
(*c*) Static Transformers.

Specifications and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a *bonâ-fide* tender.

Further particulars and information can be obtained from Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed, and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Thursday, October 16, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
September 29, 1913.

### CITY OF BRADFORD.

TRAMWAYS DEPARTMENT.

TENDERS FOR GENERAL STORES.

The Bradford Corporation are prepared to receive tenders for the supply of Miscellaneous Stores required by the Tramways Department during the year ending December 31, 1914, as follows, viz.:—

Schedule No.

1 Bolts, Nuts, Screws, Washers, Nails, Cotter Pins, Rivets, Brass Rod, Lead, Hack Saw Blades, Twist Drills, and Miscellaneous Ironmongery.
2 Files.
3 Lamp Fittings.
4 Insulating Material, Tapes, and Calico.
5 Sand Bags.
6 Copper Fuse Wire.
7 Iron, Malleable, and Steel Castings.
8 Phosphor Bronze, Gun Metal, and Brass Castings, Copper Controller Finger Contacts, and Drivers' Alarm Bells.
9 Insulated Bolts and Strains.
10 Bar Iron and Steel, and Galvanised Steel Sheets.
11 Oils and Grease.
12 Paints, Dry Colours, and Shellac.
13 Spirits and Acids.
14 Drysaltery and Disinfecting Fluid.
15 Paint Brushes and Cleaning Brushes.
16 Waste, Sponges, Washleathers, Cleaning Cloths, and Soap.
17 Transfers and Gold Leaf.
18 Glass.
19 Steel Pinions.
20 Delivery Hose, Indiarubber, Vulcanite Fibre, and Insulating Paper.
21 Timber.

Schedule and conditions of tender may be had on application at the Tramway Offices, 7, Hall Ings, Bradford, on payment of the sum of one guinea, which amount will be refunded on receipt of a *bonâ-fide* tender. (Cheques to be made payable to the order of the Bradford Corporation.) The contracts will be let subject to the Fair Contracts Clauses of the Corporation.

Samples can be inspected at the aforesaid Tramway Offices. Tenders endorsed "Tender for Stores," to be sent to me not later than Saturday, the 18th instant. The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
October 1, 1913.

### COUNTY OF LONDON.

The London County Council invites tenders for the supply and delivery of 200 Driving Wheel Centres for Electric Cars. Persons desiring to submit tenders may obtain the specifications, drawing, form of tender, etc., on application to the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C. Tenders must be upon the official forms and the instructions therein must be strictly complied with. Tenders must be delivered in a sealed envelope addressed to the Clerk of the Council, Spring Gardens, S.W., and marked "Tender for Driving Wheel Centres, L.C.C. Tramways." No tender received after 11 a.m. on Tuesday, October 14, 1913, will be considered. The Council does not bind itself to accept the lowest or any tender.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
September 29, 1913.

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## NEWCASTLE-UPON-TYNE CORPORATION TRAMWAYS.

The Tramways Committee are prepared to receive tenders for :—

12 Tramcar Bodies with Covered Tops.
12 Electrical Equipments.
12 Trucks.

Further particulars on application to the undersigned.

ERNEST HATTON,
Engineer and General Manager.

Manors, Newcastle-upon-Tyne,
September 30, 1913.

## NORTH-EASTERN RAILWAY.

TENDERS FOR CLOTHING.

The Directors are prepared to receive tenders for making Clothing, including Caps, required for Station Masters, Guards, Porters, Signalmen, etc. Forms of tender may be obtained on application to Mr. E. H. Clark, Stores, Gateshead. Sealed tenders, marked "Tender for Clothing," to be sent to the Secretary at York not later than 9 a.m. on Wednesday, November 5. The Directors do not bind themselves to accept the lowest or any tender.

R. F. DUNNELL,
Secretary.

York, September 25, 1913.

## BOROUGH OF WIMBLEDON.

MOTOR AMBULANCE.

The Corporation of Wimbledon invite tenders for the supply of a Motor Ambulance. Specification and conditions of tender may be obtained from the undersigned.

Sealed tenders, addressed to the Chairman of the Watch Committee, and endorsed "Motor Ambulance," must be sent to or delivered at my office not later than 12 o'clock noon on Saturday, October 18, 1913.

A. STEELE SHELDON,
Town Clerk.

Town Clerk's Office, Wimbledon.

## POSITIONS VACANT.

### ASSISTANTS.

Applications are invited for Assistants to work in connection with large passenger carrying company. A good and exhaustive traffic experience a *sine quâ non*.—Apply, giving full details of age, experience, and salary expected, to Box 4628, Willings, 125, Strand, W.C.


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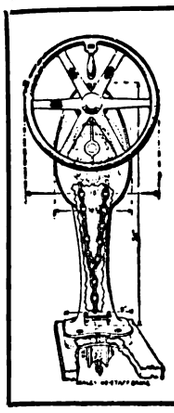

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THE
# Tramway and Railway World

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SATURDAY, OCTOBER 4, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## THE CARRIAGE OF GOODS ON TRAMWAYS.

The subject of the carrying of goods on tramways is one which has been intermittently and ineffectively discussed for years. However desirable in theory, practical difficulties always seem to stand in the way. In no part of England probably is there a better field for such an enterprise than there is in South Lancashire, and it is there that the subject is now being taken up afresh. It has been discussed between the Tramway Committees of Liverpool, Manchester, and Salford and representatives of the South Lancashire Tramway Company. The idea is to load specially constructed cars with goods at Liverpool docks and to transport the loads by the tramways to their destinations in various towns inland from Liverpool. The local circumstances are specially favourable. A large proportion of the goods would consist of bales of cotton, which are readily handled by lifting tackle, and which are compact and of considerable weight in proportion to their bulk. Similar considerations apply to the cotton cloth which, when manufactured, might be sent to Liverpool also by tramway for export. Then the interurban tramway system in South Lancashire is exceptionally complete, and only a small proportion of additional tramway lines would have to be constructed in order to give full facilities. The work would, of course, be carried on during the night, and the total distances in many cases are so moderate that the transportation, including time for delivery, would be speedier than by railway. An incentive to this use of the tramways by night when no passenger cars are running may be found in the recent increases in railway goods rates. A very powerful incentive to the local authorities responsible for road maintenance both in the boroughs and in the county is the enormous increase in the number of heavy motor lorries engaged in the transport of cotton by road. These vehicles make havoc on the highways, and pay nothing towards the upkeep. The local authorities are now involved in very serious expense for road maintenance, and the cost is ever increasing. If the bulk of this traffic was transferred to the tramways, the charges for the transport would cover the cost of maintaining the permanent way, or at all events part of it, the remainder being borne by the passenger revenue. To meet the cases where the goods could not be taken direct into or away from the mills by the tramways, local depôts would be established which would act as distributing and collecting centres. The lorry work would thus be confined to very short distance hauls, and the main roads would be relieved of much wear and tear. The only people who would stand to lose would be carrier firms, who would be confined to localised work and to work further afield. Their position at present, however, is one of exceptional privilege, because they are carrying on what is really the equivalent of a railway goods business without having to pay anything for land or permanent way and free from charges for maintenance and rates. Everything except the vehicles and their sheds is provided for them by the ratepayers. It is quite obvious that whether this tramway goods traffic scheme materialises or not, justice demands that some impost should be levied from the motor lorry firms, just as should be the case with motor omnibuses, so that the vehicles which for trade purposes tear up the roads should contribute to the maintenance in proportion to the wear that they cause. It is also clear that if tramway goods traffic is to be developed in South Lancashire, the local authorities and the tramway company concerned will have to develop something in the nature of a joint committee or board for the purpose of financing and carrying on the undertaking. That, again, might need further powers from Parliament. Those who are moving in the matter may, however, be trusted to take these and other circumstances into full consideration.

## THE REMEDY FOR THE STOPPING PLACE TROUBLE.

Whether it be due or not to the suggestion made at the sittings of the Select Committee on London Motor Traffic that the tramway authorities and the Omnibus Combine should come to an agreement to observe separate stopping places, the action of the omnibus management in coming to an arrangement with the West Ham Tramways Committee is a step in the right direction. Moreover, it should serve to counteract the plea that the statistics as to casualties demand drastic legislation. Based upon this agreement the Commissioner of Police is about to issue regulations that will remove in West Ham a source of danger to the public, and one that has been responsible for deaths and injuries in London generally. It is noteworthy that Mr. H. E. Blain, the late manager at West Ham, and now associated with the London General Omnibus Company, took a more determined stand than any other tramway manager in prosecuting omnibus drivers for this practice when it was the cause of danger to the public and obstruction to the cars. The task in reality is a police duty, but only in Croydon do they appear to have shown due appreciation of their responsibility. A few prosecutions have been instituted by the London County Council tramway department, but passengers on this system show so little inclination to support conductors in efforts to secure their safety that the employees are to be excused if they have relapsed into indifference. Now that West Ham has shown that it is possible to secure harmonious working, it is to be hoped that other authorities will effect similar arrangements. In many towns through-

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out the country complaint is frequently made of drivers of motor-cars endangering people when entering or leaving tramcars, and at some busy places police have been stationed in order to abate the danger. Only this week a Newcastle paper has urged the necessity for an extension of this safeguard, while the Glasgow Corporation last year obtained an Order under which motor and other vehicles are to observe certain regulations when passing tramcars at stopping places. A few years ago a Bradford case was taken to the High Court, with the result that the Local Government Board amended the regulation that permitted motor cars to pass only on the near side. What has been done at Glasgow may well engage the attention of the authorities in other large centres. The Glasgow by-laws are as follow :—

Every driver of a vehicle shall observe the proper rules for driving, provided that when passing a tramway car or any other vehicle which runs on fixed rails, and which is proceeding in the same direction, he shall pass on the left or near side of such car or other vehicle, except in cases of sufficient reason for deviation.

When a tramway car is standing at a tramway stopping-place, and such stopping-place is indicated by a notice on the side of the street, every driver of a vehicle who intends to pass on the left or near side of such car shall draw up immediately before arriving at such stopping-place until the roadway is clear of passengers entering or leaving a car.

On September 19th, the Magistrates' Committee of the Corporation conferred with representatives of the Scottish Automobile Club with reference to the two regulations, and the fact that the automobilists agreed to the by-laws, subject to the same receiving the approval of the Corporation and confirmation by the Sheriff, shows that a real need exists for the enactmen..

## P.A.Y.E. CAR DEBATE AT LEICESTER.

At a meeting of Leicester Council on September 30. Alderman Flint moved the adoption of the Tramways Committee's report recommending the purchase of ten more P.A.Y.E. cars. Apart altogether from the question of pay-as-you-enter cars, they must have some more cars, and the probability was that in a short time they would have to ask for another ten or twenty. With regard to the P.A.Y.E. cars, they considered these cars had met all reasonable objections. The agitation against them had been got up by a few people. In Aberdeen and Gateshead, where the system had been in operation, there had never been a word of complaint. Many people had condemned these cars who had never seen them, and many people did not know the way in which objections had been met. The Corporation should consider honestly and fairly the advantages, and put them by the side of any disadvantage. Their duty was to promote the convenience and comfort of their tramway passengers, and they were not going to set their faces against any suggestion towards that end. There was no delay on the cars. It was stated that they did not make the journey so quickly; he said without hesitation that the journey was made in as short a time as ever before. They were not going to give the system up at the first breath of criticism. If at the end of a period of trial they had fixed in their minds the system was not found better than the other then they could give it up. Some people objected to have to pay before they entered, but, considering the advantages of the system, he did not think that amounted to much. They were now proposing to run a through service, so that people would be able to ride from the Narborough Road terminus to the Midland Station without getting off the car.

Alderman Banton seconded, and Councillor Hawkes proposed that the recommendation be referred back for further consideration. He had moved in the committee that considering the prejudice that existed the cars on the Narborough Road route be transferred to another, to see if the same prejudice would be apparent there, and he was sorry to say that he only received the support of one member.

Councillor Hincks said there was a strong outburst of feeling against the cars after the first day or two's experience. If they could have seen one or two members of the Council trying to get up that narrow staircase! (Laughter.) A man of ordinary stature could get up, but anybody of any girth got wedged. It was a positive danger for a woman with a baby to get up these stairs, and a greater danger for her to get down them. Alderman Flint had given certain concessions, thereby proving the efficacy of the agitation against the cars. Every concession he had made had been against his own principle, and had been bringing the pay-as-you-enter cars nearer the old-fashioned cars.

Alderman Chaplin said he had not heard the remarks referred to, though he had used the cars a good deal. His opinion was that it could not be said to be a quicker method, it was not a more convenient method, and he did not think it was better in any sense except from the point of view of safety. From this point they were an improvement, and if they only saved one limb in 20 years he thought they ought to have them.

Councillor Lovell said these cars cost more than the others—he believed £60 more, besides the £20 royalty. The committee must remember that the cars were for the people, not the people for the cars.

After further speeches in opposition, Councillor Hand said he was compelled to use the cars frequently, and he had listened to all the objections raised against the cars. First of all there were objections, but for the last month or two there had been practically none.

Alderman Banton said the manager's reports showed that the service had been increased from five minutes to 4½ minutes. Now the cars would be run round the corner, and four to five minutes would be saved. In regard to wet days—it took no longer to load up a car. He believed in the queue, and a number of people got in quicker now than they did before inspectors had been put on special duty. Accidents last year amounted to 449, and these would be in large measure decreased. He appealed to them to consider the conductor.

Alderman Flint, in reply, said that there was not a 'bus in or out of London where the steps were not narrower and steeper than in the new cars. Another reason the fares had gone down was the reduced fares to children. More people had been actually carried than before.

The amendment was carried by 24 votes to 20. Another count being taken, the amendment for the report to be referred back was carried by 25 votes to 22.

## GLASGOW TO CONSIDER UNDERGROUND RAILWAYS.

The City Council on September 26 by 19 votes to 16 adopted the following motion by Councillor Shedden :—"That as a means of solving the question of congestion on the streets, and of giving facilities towards the expansion of the city, the Corporation appoint a special committee to consider and report as to the feasibility of establishing a system of tube electric railways from east to west (say Shettleston to Clydebank), and from north to south (say Bishopbriggs to Rouken Glen)."

Mr. Hamilton seconded. Parallel routes as a tramway reform would not relieve congestion very much. The three remedies open to them to relieve congestion on the busy streets were aerial railway, underground tube, and motor 'buses. The Corporation, he thought, should take time by the forelock and have a committee sitting on the question.

Mr. Hugh Alexander said the proposal was altogether impracticable. They were asked to consider a scheme which, he believed, would cost about £10,000,000.

## ABERDARE TRAMWAYS AND RAILLESS TRACTION.

The Board of Trade inspection took place yesterday of the new installation of tramways and railless traction on the Cedes-Stoll system belonging to Aberdare Urban District Council. Trial runs had previously been made, and everything was found to work very satisfactorily. The undertaking, for which Messrs. Stephen Sellon and Partners have been the consulting engineers, was authorised by Act of Parliament in 1911, and the route lengths comprise 2¾ miles of tramways and 3½ miles of roads equipped for the trackless trolley system of electric cars. The tramways are constructed as a single line with passing places, and the overhead equipment is mainly on the span wire method. The four railless routes, which diverge from the tramway at four different points, are equipped on the Cedes-Stoll system with bracket arm construction. Single-deck tramcars, each with seating accommodation for 28 passengers, are used, while the railless cars each seat 27 passengers. The depôt is situated at Gladlys, in close proximity to the Council's generating station. In the latter, additional plant has been installed for the purpose of meeting the traction load.

## NEW AND PROSPECTIVE WORK.

Birmingham.—The City Council on October 1 decided to promote a Bill for the construction of a number of tramway extensions.

Brighton.—The track in Beaconsfield Road is to be renewed at an estimated cost of £4,500 after the completion of the renewal of the London Road track.

Cardiff.—It is recommended by the Tramways Committee that the line in Ninian Road be doubled immediately at an estimated cost of £6,000.

China.—Canton has an extensive tramways scheme under consideration. No progress is being made with the scheme for the construction of tramways in Pekin.

Leeds.—A Local Government Board inquiry was held on September 26 into an application by the City Council to borrow £168,500 for new plant to develop the electricity undertaking.

Leicester.—The Corporation on September 30 adopted a proposal by the Tramways Committee for the immediate construction

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of a line from the West Bridge along St. Augustine Street and King Richard's Road to Fosse Road. The total estimated cost of the work is £30,000; £19,000 of this is for road widenings and the other £11,000 for the tramways. Alderman Flint stated that if the tramways were constructed the Fosse Road service would be operated at considerably less cost than it was at present. The saving would be almost enough to pay six per cent. on the total outlay.

Messina.—A concession has been granted to the Sicilian Tramways Company for the construction and working of an electric tramway system. The total length of the entire system will be 48 miles.

Newcastle.—Longbenton Council have decided to assist Newcastle Corporation in obtaining powers to extend the tramways from the terminus at Heaton Cemetery *viâ* Longbenton to Forest Hall and link up with the tramway system at that point, with the aid of motor 'buses to Benton Square on the east side, and to West Moor, Camperdown, and Burradon on the north side.

Nottingham.—It is stated that in the near future the Tramways Committee will consider the question of extending the system from Derby Road to Wollaton Park gates.

Preston.—The Tramways Committee recommend that powers be obtained for the construction of three new lines, which will link up portions of the existing system. A line will be constructed from Moor Park Avenue, on the Garstang Road, to Brook Street, near the Cattle Market, and join the present line at Ashton-on-Ribble. The second extension will connect the Fulwood line, while the existing dead ends in Corporation Street will be linked up, making a through line to the railway station. Another new line will be laid along London Road to Walton Bridge, a distance of a mile.

Russia.—The Council of Ministers has approved the proposal by the Minister of Finance to grant a concession to M. S. U. Lampitsky to construct and exploit an electric tramway from the town of Warsaw to the village of Lounjanky, in the district of Warsaw.—The Town Council of Karkoff has decided to buy up the horse tramway system in the town.—The town of Karbin proposes to construct a three-line tramway about 12 versts (8 miles) long.—The Minister of Ways of Communication has approved the proposed issue of a loan by the town of Samara for the construction of an electric tramway and the extension of the electric lighting system.

Wemyss.—The Tramways Company propose to double the line from Leven High Street to Muiredge.

West Hartlepool.—The Tramways Committee have been asked to consider the question of extending the tramways to Middlesbrough *viâ* a proposed new road.

York.—Railless trolley car installations are recommended by the Tramways Committee on the following routes:—Nessgate to Layerthorpe and Howorth, Nessgate to Huntington Road, *viâ* Goodramgate and Monkgate, and from the station down Bootham to Clifton. Tramway extensions are advised in Corporation Street and Hall Road, and from Clifton Scope to Leeman Road, *viâ* a bridge to be constructed across the Ouse.

## MISCELLANEOUS NEWS AND NOTES.

**New Cars for Wigan.**—The Council have decided to apply for sanction to borrowing £5,700 for the purchase of six new tramcars.

**Railless Cars Scheme to Serve a Kent Colliery.**—It is stated that the collieries which will shortly be in operation near Dover are considering the question of installing a railless car service to that town.

**Wrexham Tramways Company to Use Motor Omnibuses.**—In order to meet the needs of the district between Chester and Mold the Wrexham and District Electric Tramways Company have decided to run a motor omnibus service.

**Cambridge Street Tramways Company.**—Cambridge Corporation on September 25 agreed to present a petition for the winding up of this horse traction undertaking, the Town Clerk having failed to secure payment of the money due for road repairs.

**British Omnibuses for Russia.**—It is reported from Odessa that an English company is arranging to start a number of public motor 'bus services in the Crimea, between Simferopol and the following places: Eupatoria, Alupka, and Theodoria.

**A New Lanarkshire Route.**—Major Pringle, of the Board of Trade, on September 24 inspected an extension of the Lanarkshire Tramway Company's system from New Stevenson Cross to Bellshill, and the route was subsequently opened for traffic.

**Omnibuses for Edinburgh.**—On September 30 a conference was held between the Tramways Committee and the Tramways Company for the consideration of routes for the experimental running of motor omnibuses by the company, the vehicles to be purchased by the City Council.

**A Tribute to Wolverhampton.**—Speaking at a meeting of the newly-formed district council of tramwaymen and carters of Birmingham and South Staffordshire, Mr. Vaughan, a delegate, stated that if every class of labour had met with the same courtesy from their employers as had the local tramwaymen, there would have been fewer disputes.

**Omnibuses for the Yorkshire Tramways Company.**—Yorkshire (Woollen District) Tramway Company have ordered three motor omnibuses, to be run experimentally from Dewsbury Market Place to Dewsbury Moor, from Dewsbury Market Place to Shawcross, and between Shepley Bridge, Bradley, and Brighouse. The new services are expected to begin in November.

**Car Builders' Wages in Australia.**—Owing to the Wages Boards having made the wages of the car builders in Victoria higher than in any other State a member of the Prahran Council has reported that he fears the orders for new bogie cars to be given out by the Prahran and Malvern Tramways Trust will go out of the State as all other such work has done.

**"Southern" Motor Omnibuses.**—Since the amalgamation of the South Metropolitan Tramways Company with the London traffic combine the company, whose traways serve the district between Croydon, Crystal Palace, Sutton, and Tooting, have placed a number of motor omnibuses in service between the Crystal Palace and the Albany Street Barracks in north-west London.

**Underground Railways for Sydney.**—The Minister for Public Works, New South Wales, recently stated that he will seek authority for the immediate construction of underground railways at Sydney. "Before these underground railways can be constructed," says the Minister, "the traffic will have reached such dimensions that no surface tramway in the world could cope with it."

**Electric Autobuses for Berlin.**—It is announced that two lines of electric autobuses are about to be established in Berlin. The 'buses will, like the electric cabs, carry their power in accumulators. The persistence of the electric cab proves that compensation has been found for the great weight of the accumulators in the absence of smell and noise and other inconveniences of fuel-burning autovehicles.

**Excess Passengers at Birmingham.**—Interviewed on the subject of complaints regarding "strap-hanging" in the tramcars, Councillor Harrison Barrow, chairman of the Tramways Committee, has stated that the conductors were only authorised to allow six such passengers. The conductor had power to admit the standing passengers at all hours of the day, but personally he thought a good deal of difficulty would be saved if these additional fares were limited to an hour or so in the morning and a couple of hours in the evening. The congestion would be relieved, the committee hoped, when the eight additional cars ordered were on the lines.

**Light Railway Orders.**—The Board of Trade have recently confirmed the undermentioned Orders made by the Light Railway Commissioners:—Birmingham Corporation (Quinton) Light Railway Order, 1913, authorising the construction of a light railway in the city and county of Birmingham and in the parish of Warley in the urban district of Oldbury, in the county of Worcester, in extension of the light railway authorised by the Birmingham Corporation Light Railway Order, 1912; Southwold Harbour Light Railway Order, 1913, authorising the construction of a light railway in the Borough of Southwold, in the county of Suffolk, connecting Southwold Harbour with the Southwold Railway.

**Omnibus Company's Request to East Ham Tramways.**—In reporting to East Ham Council on a request received from the London General Omnibus Company for the Council to remove their tramway standards in a portion of Forest Drive in view of the possible danger to passengers on the 'buses, Mr. C. Ullman, the tramways manager and engineer, pointed out that considerable expense would have to be incurred in the near future in the Manor Way, where subsidences in the track and roadway have occurred since the inauguration of the service of 'buses. The annual report shows a deficiency of £1,217 on the undertaking during the year ended March 31 last, being an increase of £729. The income was £57,960, and the working expenses £45,808.

**Trail Cars and Motor Omnibus Powers for Birmingham.**—The Bill to be promoted next Session by the Corporation will include powers to provide and run motor omnibuses and coupled and trail tramcars within the city.—Councillor Harrison Barrow, in moving the adoption of the clause at a meeting of Council on October 1, said the committee had been in communication with the omnibus company in reference to the purchase of all their interests in the city, and they had practically come to an agreement with regard to price. The company required to have facilities for running omnibuses from outside districts, such as Halesowen, Shirley, and Coventry, and they had promised they would not in any way interfere with the local services. He hoped to be able to report shortly that they had come to a settlement with the company.

**The Brill "Radiax" Truck.**—The J. G. Brill Company (110, Cannon Street, E.C.) have issued an admirably illustrated booklet on their radial truck which has met with much success on many tramway lines in the United States, on the Continent, in South Africa, Tasmania, Japan, and China. Patent rights have been granted or are being applied for in all countries. The trucks have a solid forged frame, and the patented device consists of pairs of swing links of special forms mounted on spiral springs, which rest in ears cast on each side of the journal boxes. The upper end of the links is of hemispherical form and rests in a socket casting at the top of the spring. The link passes through the spring, and at its lower end has two pins or trunnions, which engage in grooves formed in a casting enclosing the lower part of the frame. On a straight track, with the link upright, the frame rests on both pins. Whenever from any cause the link is inclined from the perpendicular, one or other of the pins leaves its groove, thereby producing an inclination between the two supporting points of the link, equal to half the distance between the pins, and an immediate and powerful tendency is set up to return to the normal position. The links are of exceptional length and permit of a considerable radial movement. The motors are fixed and the brake gear is arranged in the most advantageous manner. The truck has been designed to interchange, after slight modifications, with any type of non-radial body.

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**The Labour Troubles at Dublin.**—In order to relieve the police, military guards have been placed at the tramway power-house and at twelve of the company's depôts since September 25. On September 26 application was made for eviction orders against a number of late employees of the company who are occupants of the company's cottages, but on the application of a solicitor the hearing was adjourned for two weeks pending the result of the Board of Trade inquiry by Sir George Askwith, Sir T. R. Ellis, and Mr. Clynes, M.P., into the circumstances of the general labour troubles now experienced in the city. Mr. W. M. Murphy, chairman of the tramways company, was one of the employers who gave evidence at the inquiry on October 2 and 3. He stated that the tramway strike occurred in the Horse Show week, and that within one hour afterwards an ample service of cars was being run.

**The Development Commissioners and Rural Transport.**—Three applications were received during the year 1912-13 by the Development Commissioners for grants towards rural transport schemes. One related to a service of motor cars and the others to light railways. No grants are to be considered until after the Board have received a report from an engineer familiar with commercial motor transport on the relative merits of light railways and motor transport. The Commissioners state that they have reason to think that some important schemes are likely to be brought forward shortly. So far no grants have been made to transport schemes during the three years the Commission has been in existence. The reason for the failure of the Act in this respect as well as in regard to afforestation, land drainage, and reclamation is attributed in the report to the fact that no advances can be made to individuals or to companies trading for profit. The Commissioners suggest that this difficulty might to some extent be overcome by the formation of national associations to receive and administer advances. Such an association, we may add, has been formed for the counties of Aberdeen, Banff, and Kincardine for the purpose of constructing light railways.

**A Portsmouth Extension.**—The third of the tramway extensions recently constructed at Portsmouth has been completed, the trial car having been driven in turn by Councillors Main and Stobil, who received a tribute from the Mayor (Councillor Corke), the chairman of the Tramways Committee, for their efforts to bring the scheme to fruition. The new line connects the system between the end of Goldsmith Avenue and the junction of Eastney Road. The cost has been £5,887, the total outlay on the three extensions being £25,069. The Mayor congratulated the manager and engineer and their respective staffs upon the excellent manner in which the work in connection with the extension had been carried out. Mr. V. G. Lironi, electrical and permanent way engineer, and Mr. W. R. Spaven, general manager, returned thanks on behalf of their staffs, both agreeing that the extensions which had lately been inaugurated would prove an acquisition to the general system. Councillor J. Timpson (vice-chairman), who has been associated closely with the work connected with the extension, proposed the health of the Mayor, thanking him, on behalf of the Council and Committee, for the time, attention, and trouble he had given. In response the Mayor remarked that the Committee were quietly pursuing a progressive policy, and would not be satisfied until they had got the system into a perfectly sound running condition, whether it applied to the cheapening of fares or improving the conditions of their employees.

## PERSONAL.

**Mr. H. A. Goodyer,** of Walsall, has been appointed chief clerk in Coventry Corporation tramways department.

**Mr. W. H. Milnes,** assistant engineer, Coventry Corporation tramways, has had his salary increased from £180 to £200 per annum.

**Dr. Hans Goldschmidt,** whose name is well known in connection with the patent alumino thermic process, has been granted the title of Professor.

**Mr. J. E. Waller** has been paid £52 10s. for professional services rendered in connection with the tramways provisions of the Coventry Corporation Act, 1913.

**Mr. Justus Eck,** engineer-in-chief and general manager of the Union Electric Company, left England by the "Majestic" on October 1 for a tour in the United States.

**Mr. H. J. Somerset** has retired from the position of manager of the Perth (W.A.) tramways, which have been purchased by the Government, and is returning to England.

**Mr. G. Cardwell,** manager of the Devonport and District Tramways Company, has been presented with a silver tea and coffee urn by the employees on the occasion of his marriage.

**Mr. G. A. Burls,** formerly of J. I. Thornycroft, Limited, motor vehicle manufacturers, has prepared a report for the Development Commissioners in a specific case on the relative merits, particularly from a financial point of view, of light railways and motor transport.

**Mr. J. Willey,** late rolling stock foreman, Isle of Thanet Electric Tramways Company, has been presented with an oak writing desk and an oak umbrella stand on the occasion of his departure to enter a local business. In the absence of Mr. J. A. Forde, the manager, the presentation was made by Mr. A. J. Bousfield.

**Mr. J. S. D. Moffet** has been presented with a canteen of cutlery by the chief officers of Rochdale Council upon his departure to take up the duties of general manager of the West Ham tramways. The gift was handed over by Mr. T. R. Bail, the gasworks manager, and speeches were also made by Mr. W. H. Hickson (Town Clerk), Mr. S. Platt, and Mr. G. Webster, the new manager of the tramways.

**Mr. C. W. G. Little,** chief electrical engineer of the British Electrical Federation, Limited, on behalf of the Swansea Improvements and Tramways Company, who are lessees of the Mumbles Railway and Pier undertaking, is advising the company on the subject of the proposed electrification of the railway from Swansea to the Mumbles, which was described and illustrated in our issue of June 13, 1912. In our last issue Mr. Little's initials were incorrectly given.

**Mr. Peter Fisher,** manager of the Dundee tramways, and Mr. Robertson, manager of the Greenock Council's electricity department, have been consulted by the Stirling Corporation with regard to Messrs. Baifour, Beattie and Company's offer to carry out the electrification of the tramways and to purchase the power station. Mr. Fisher on September 28 was congratulated by Dundee Tramways Committee on his election as vice-president of the Municipal Tramways Association, which will meet at Dundee in 1915. Convener G. A. Johnston observed that the appointment was a compliment to Dundee as well as to Mr. Fisher, who was recognised as being a thoroughly up-to-date tramway manager.

**Presentations to Mr. H. E. Blain.**—At a largely attended gathering of employees of the West Ham Corporation tramways and their friends, Mr. H. E. Blain, who vacated the position of tramways manager recently, received further presentations on behalf of the staff. The gifts of the Employees' Social and Athletic Club were a handsome French gilt drawing-room clock with two painted china ornaments, whilst presents from the inspectors' staff were a crocodile cigar case and a gold-mounted amber cigar holder. Mr. Blain has also been the recipient of a very artistic illuminated and framed testimonial under the seal of the West Ham Corporation over the signatures of the Mayor and Town Clerk, testifying the appreciation of the Council of his services during his ten years in West Ham.

**Mr. Leonard Johnston** has been congratulated by Gloucester Tramways Committee upon obtaining the appointment of manager of the Southampton Corporation tramways, where he will begin duty in the third week of October. Alderman Talbot, chairman of the committee, mentioned that a deputation from Southampton visited the city in connection with the appointment of Mr. Johnston. Alderman Dunsford, the chairman of the Southampton tramways, went to the depôt and looked over everything, and was very pleased with what he saw. He also went over the track and examined it very minutely, and afterwards said that Gloucester had a system of which it ought to be proud. That gentleman had had very great experience of tramway work, and on his return he wrote a letter in which he said that it was largely due to what the deputation had seen at Gloucester and of Mr. Johnston's work that they had no hesitation in selecting him.

**The Late Mr. Anthony N. Brady,** the tramway, gas, and electric power promoter, who died suddenly in the Carlton Hotel, London, on July 22, left a will, which, after making ample provision for the support of the widow, divides the balance of the estate, which is estimated at £14,000,000, among five children and one grandchild.

**Mr. Frame Thomson,** who on September 28 was found dead in his house at Highgate, was to have sailed yesterday (Friday) for South America. Mr. Thomson was a director of the following companies:—Alliance Investment, Anglo-Argentine Tramways (deputy-chairman), Cordoba Light, Power and Traction (chairman), La Plata Electric Tramways, and United Electric Tramways of Monte Video (deputy-chairman). At the inquest it was stated that the deceased was extracting a cartridge from a gun he kept for shooting pigeons when the charge entered his body. The jury found that the occurrence was accidental.

## CONTRACTS AND ORDERS.

**Bexley Council** have accepted the tender of Siemens Bros., Limited, for a motor-generator, at £320.

**The Dunlop Rubber Company** have received a contract for the supply of solid tyres to the Sheffield Corporation's motor omnibuses.

**Walthamstow Council** have accepted the tender of W. T. Henley's Telegraph Works Company for the supply of 550 yards of three-core l.t. cable, at £200 10s.

**Babcock and Wilcox, Limited,** have received a contract for the supply of a boiler, superheater, and mechanical stoker at Southampton electricity works, at £1,661.

**Derby Council** have been recommended to make a contract with the Bell Punch and Advertising Company for the supply of tramway tickets at 2½d. instead of 1⅞d. per thousand.

**Westinghouse Machine Company** have, according to American engineering journals, received a contract for the supply of three turbo-generating units, each of 30,000 kw. capacity, for the New York subway extension.

**Mr. John Taylor,** of Strand Street, Liverpool, has recently received the following orders for his patent tubular sanding devices:—County Borough of Rotherham, for 100; the Brush Electrical Engineering Company, Limited, for 20, for the Salford Corporation cars.

**Wimbledon Council** have accepted the following tenders:—British Thomson-Houston Company, 1,500 kw. turbo-alternator, condensing plant, pipework and auxiliaries, £8,711; Herbert Morris, Limited, overhead travelling crane, £258; British Electric Transformer Company, one 75 kw. and one 50 kw. electric transformer, £123.

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# FINANCIAL REPORTS AND MEETINGS.

**Babcock and Wilcox, Limited.**—The directors announce an interim dividend of 7 per cent. on the ordinary shares for the half-year ended June last.

**Lisbon Electric Tramways.**—An interim dividend of 3 per cent., free of income-tax, on account of earnings of current year has been declared, payable on November 7 on ordinary shares.

**The British Electrical Federation.**—The traffic statement for the week ended September 26, 1913, shows that the receipts from tramways and railways amounted to £42,231, as compared with £38,733 in the corresponding week last year, and from omnibuses £1,683, as compared with £1,282, making a total of £55,914, as compared with £40,015. The tramway and railway route mileage was 429.82, as compared with 431.52. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working, both last year and this year, the receipts show an increase of £3,914 upon the week.

**Shareholders' Complaints at Meeting of Diesel Engine Company.**—At a meeting of the shareholders of the Diesel Engine Manufacturing Company, Limited, on Wednesday, Mr. Ellis, the chairman, informed his hearers of the remarkable disappearance of Dr. Diesel from the Great Eastern Railway Company's boat during the passage from Antwerp to Harwich on Monday night. The extraordinary news, however, did not prevent strong expressions of disapproval on the part of a number of shareholders at the absence of any accounts for the year, and, as a result of some pressing questions, the fact was elicited that the profits were not as large as the prospectus indicated.

**Auckland Electric Tramways Company.**—There is a surplus on the year's working of £54,178, making with £8,267 brought forward, a total of £62,445. The dividend on preference shares paid and accrued to June 30, 1913, requires £8,455, and an interim dividend on the ordinary shares for the half-year ended December 31, 1912, of 7d. per share, free of income-tax, was paid in May last, and amounted to £10,208. The directors recommend that £17,500 of the available balance be transferred to reserve account, bringing the account to £102,500, and that a further dividend be paid on the ordinary shares of 1s. per share, free of income-tax, for the half-year ended June 30, 1913, making a total dividend of 1s. 7d. per share for the year. This will require £17,500, and leave £8,782 to be carried forward. The traffic receipts, which amounted to £257,591, show an increase of £28,449. To provide the necessary funds for the company's purposes it is proposed to make an issue of £100,000 in ordinary shares.

**British Westinghouse Electric and Manufacturing.**—An extraordinary meeting was held on September 26 to consider resolutions authorising that the capital be reduced to £1,150,000. Mr. J. A. Bryce, who presided, said that the scheme had been delayed owing to the litigation between the company and the Underground Electric Railways of London. Their total claim outstanding against the Underground was approximately £122,000. The appeal to the House of Lords had been successful, they had got back from the railway company the amount they had paid under the award, and they recovered a further £42,500 with an understanding that their former friendly relations should be resumed. With regard to the scheme, the net total by which it was proposed that the capital of the company should be reduced was £725,000. Of that £225,000 would be applied to writing the ordinary shares down to £2 per share. The balance would be written off the preference shares. The resolutions were carried.

**Preston Corporation Tramways.**—In his report for the year ended March 31, which has just been issued, Mr. J. F. Simpson, engineer and manager, states that the sustained improvement in the trade of the town has been reflected in the returns, which show an increase in total revenue of £2,623, and an addition of 567,296 in the number of passengers. The financial results for the year, as compared with the previous year, are as follow :—

| | 1911—12. | | 1912—13. | |
|---|---|---|---|---|
| | Pence per car mile. | £ s. d. | Pence per car mile. | £ s. d. |
| Total income .. .. | 10.415 | 40,647 8 10 | 10.698 | 43,270 11 10 |
| Working expenses .. | 6.144 | 23,972 5 0 | 5.949 | 24,065 0 10 |
| Gross profit .. .. | 4.271 | 16,675 3 10 | 4.748 | 19,205 11 0 |
| Capital charges .. .. | 2.674 | 10,434 3 7 | 2.517 | 10,182 6 10 |
| Gross balance to reserve .. | 1.597 | 6,241 0 3 | 2.231 | 9,023 4 2 |
| Less special charges .. | — | — | .902 | 3,648 16 2 |
| Net balance to reserve fund | 1.597 | 6,241 0 3 | 1.329 | 5,374 8 0 |

The special charges include three new cars costing £2,412, covering top decks of five cars, new plates for accumulators, etc. The new cars are of the single deck, saloon type, and provide seating accommodation for 42 passengers. They were built by the United Electric Car Company, the electrical equipment being supplied by Messrs. Dick, Kerr and Company. In view of the success of the undertaking, the manager thinks that extensions to outlying districts might seriously be considered, "especially in view of the success that has attended the introduction of methods of traction which do not necessitate the use of expensive permanent way." The tramways department now employ 203 persons, and have about 10½ miles of route length and 33 cars. The car mileage is 970,719 miles, the average number of car miles per car per day being 132 miles. The energy consumption was 1.309 units per car mile, the power costs per unit being .384d., with an average power cost per car mile of food. The ratio of working expenses has decreased from 59.22 to 55.63 per cent.

**Dick, Kerr, and Company, Limited.**—The report states that the profits earned during the twelve months to June 30 last amount to £30,092, which, added to £10,016, the sum forward, makes a total of £40,108. Out of this sum the debenture interests have been paid, and there has been reserved the sum required to provide for the premium payable on the redemption of the present debenture stock. These items absorb £11,483, leaving £28,624 available. The directors propose to pay a dividend of 6 per cent. per annum on the preference shares, and to carry forward £10,324. Whilst the profits for the year are sufficient to cover the payment of the debenture interest and the preference dividend, leaving the profit to be carried forward slightly larger than the amount brought forward from last year, the directors regret that they are unable to recommend a dividend on the ordinary shares.

# COPPER AND ALUMINIUM MARKET.

October 3, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, October 3. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 74 5 0 .. | 72 10 0 .. | 79 0 0 |
| ,, ,, (three months) .. .. | 74 2 6 .. | 72 7 6 .. | 79 17 6 |
| Electrolytic Copper—bars or ingots .. | 78 0 0 .. | 77 15 0 .. | 82 0 0 |
| Aluminium—bars or ingots .. .. .. | 88 0 0 .. | 86 10 0 .. | 81 0 0 |

# COAL MARKET.

October 3, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, October 3. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 .. | 25 0 .. | 22 9 .. | 20 9 |
| Best Seconds.. .. .. | 23 6 .. | 23 9 .. | 22 0 .. | 20 0 |
| Ordinary Drys .. .. | 21 0 .. | 21 0 .. | 20 3 .. | 19 3 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 6 .. | 18 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 0 .. | 17 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 .. | 20 6 .. | 17 3 .. | 16 9 |
| Best Seconds .. .. | 19 0 .. | 19 3 .. | 16 6 .. | 16 0 |
| Ordinary Drys .. .. | 16 6 .. | 16 6 .. | 14 9 .. | 15 3 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 14 6 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 .. | 14 9 .. | 13 0 .. | 11 10½ |
| Best Seconds .. .. | 13 6 .. | 13 6 .. | 12 6 .. | 9 10½ |
| Smalls .. .. .. | 8 3 .. | 8 3 .. | 10 0 .. | 5 6 |

# FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Sept. 30 | £51,960 | £55,080 | 39 | £2,155,720 | +£178 927 |
| Auckland..... (14 days) | Aug. 29 | 18,602 | 19,543 | 9 | 41,610 | + 1,150 |
| Ballarat and Bendigo | Aug. 17 | 835 | 808 | 20 | 17,530 | — 276 |
| Brazilian St. Rly. Mlrs | August | 40,419 | 50,402 | 4 | 50,402 | + 9,983 |
| Brazilian Traction..... | Sept. 27 | 68,440 | 94,508 | 39 | 3,489,160 | + 490,276 |
| Brisbane ..... | August | 27,680 | 29,970 | 34 | 207,178 | + 48,784 |
| British Columbia .....$ | August | 675,272 | 770,628 | 8 | 1,526,571 | + 201,054 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacroze.. | August | 41,677 | 44,462 | 8 | 89,684 | + 6,009 |
| Calcutta.....Rs. | Sept. 27 | 66 634 | 70,896 | 39 | 25,17,192 | + 1,40,559 |
| Cape Town ..... | July | 10,575 | 11,417 | 30 | 86,900 | + 5,182 |
| Carthagena & Herrerias | Sept. | 2,982 | 1,844 | 39 | 24,661 | + 5,395 |
| East India ..... | August | 1,922 | 2,005 | 4 | 2,005 | + 83 |
| Kalgoorlie..... | August | 3,887 | 3,357 | 34 | 23,379 | — 2,158 |
| La Plata..... | Sept. | 4,143 | 4,528 | 39 | 45,611 | + 9,415 |
| Lima..... | August | 31,828 | 33,900 | 34 | 266,537 | + 12,838 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,438 |
| Madras (14 days) Rs. | Sept 30 | 23,810 | 24,891 | 39 | 484,183 | + 85,047 |
| Melbourne ..... | Sept. | ... | 62,000 | ... | ... | ... |
| Mexico .....$ | August | 578,658 | 635,445 | 34 | 4,511,557 | + 90,889 |
| Montevideo..... | Sept. | 27.711 | 27,870 | 47 | 344,301 | + 26,483 |
| Para ..... | Sept. 28 | 3,693 | 3,455 | 43 | 171.575 | + 988 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | July | 3,126 | 3,256 | 30 | 25,127 | + 6,662 |
| Shanghai .....$ | Sept. 24 | 22,172 | 25,200 | 38 | 833,652 | + 92,481 |
| Singapore .....$ | Sept. 27 | 9,979 | 11,771 | 39 | 464,180 | + 58,925 |
| Toronto .....$ | August | 727,925 | 850,222 | 34 | 6,317,674 | + 864 574 |
| Winnipeg.....$ | August | 303,764 | 340,507 | 34 | 2,649,702 | + 2:1,872 |


# DICK, KERR & CO.,

**Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**


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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Sept. 21 | £1,669 | £1,700 | + £91 | 17 | £29,460 | + £1,874 |
| Ayr Corporation ..... | ,, 27 | 281 | 332 | + 51 | 19 | 5,873 | + 1,253 |
| Bath Electric ..... | ,, 24 | 985 | 1,075 | + 90 | 39 | 38,611 | + 2,929 |
| Birkenhead Corp. ..... | ,, 28 | 1,174 | 1,450 | + 276 | 26 | 34,015 | + 3,453 |
| Birmingham Corp. ..... | ,, 27 | 11,297 | 13,096 | + 1,799 | 26 | 249,185 | + 23,376 |
| Blackburn Corporation | ,, 27 | 1 217 | 1,421 | + 204 | 26 | 35,077 | + 3,289 |
| Blackpool & Fleetwood | ,, 27 | 1,113 | 1,214 | + 101 | 13 | 24,747 | + 3,917 |
| Blackpool Corporation | ,, 25 | 2,345 | 2,589 | + 244 | 25 | 65,187 | + 9,906 |
| Bolton Corporation ..... | ,, 28 | 2,455 | 2,802 | + 347 | 26 | 71,867 | + 4,119 |
| Bournemouth Corp..... | Oct. 1 | 1,872 | 2 203 | + 331 | 26 | 61,290 | + 7,249 |
| Bradford Corporation... | Sept. 27 | 5 577 | 5,905 | + 328 | 24 | 156,243 | + 9,561 |
| Brighton Corporation... | ,, 27 | 1,026 | 1,272 | + 246 | 26 | 31,943 | + 2,043 |
| Bristol ..... | ,, 28 | 7,284 | 8,447 | + 1,163 | 38 | 313,239 | + 43,935 |
| British Elec. Federatn. | ,, 26 | 40,015 | 55,914 | * | ... | ... | ... |
| Burnley Corporation ... | ,, 27 | 1,507 | 1,791 | + 284 | 26 | 41,946 | + 5,630 |
| Burton-on-Trent Corp. | ,, 28 | 267 | 303 | + 36 | 26 | 7,659 | + 336 |
| Bury Corporation..... | ,, 28 | 1,240 | 1,456 | + 176 | 22 | 35,925 | + 1,347 |
| Cardiff Corporation..... | Aug. 31 | 2,571 | 2,969 | + 398 | 22 | 61,014 | + 6,743 |
| Chatham and District.. | Sept. 25 | 898 | 1,020 | + 122 | 38 | 35,590 | + 2,114 |
| Chesterfield Corp. ..... | ,, 25 | 225 | 259 | + 34 | 25 | 6,668 | + 843 |
| Colne & Trawden..... | ,, 27 | 274 | 292 | + 18 | 39 | 10,742 | + 716 |
| Cork Electric..... | ,, 25 | 474 | 530 | + 56 | 38 | 19.249 | + 351 |
| Croydon Corporation ... | ,, 24 | 1,800 | 1,716 | — 84 | 24 | 41 543 | — 4,765 |
| Darlington Corporation | ,, 27 | 215 | 288 | + 53 | 26 | 6 538 | + 633 |
| Derby Corporation ..... | ,, 27 | 800 | 1,056 | + 176 | 26 | 26,020 | + 2,779 |
| Dover Corporation .... | ,, 27 | 249 | 283 | + 33 | 26 | 7,072 | + 87 |
| Dublin & Lucan ..... | ,, 26 | 161 | 119 | — 42 | 12½ | 2,190 | + 66 |
| Dublin United ..... | ,, 24 | 5 562 | 3,310 | — 2.252 | 33 | 220,388 | — 6,100 |
| Dundee City ..... | ,, 24 | 1,241 | 1,317 | + 78 | 19 | 25,376 | + 1.893 |
| East Ham Corporation | ,, 27 | 1,037 | 982 | — 85 | 24 | 26 565 | — 1,15 2 |
| Exeter Corporation .. | ,, 26 | 332 | 366 | + 34 | 26 | 9,388 | + 404 |
| Gearless Motor 'Buses. | ,, 27 | ... | 615 | ... | 25 | 12,088 | ... |
| Glasgow Corporation .. | ,, 27 | 19,400 | 21,110 | + 1,710 | 17 | 339,169 | + 23,265 |
| Glossop(U.Elec.Supply) | ,, 27 | 121 | 136 | + 15 | 39 | 5,075 | + 560 |
| Halifax Corporation ... | ,, 23 | 2.127 | 2.180 | + 54 | 25 | 55,376 | + 1,156 |
| Hastings & District..... | ,, 25 | 1,184 | 1,285 | + 101 | 39 | 41,977 | + 2,973 |
| Huddersfield Corp. ..... | ,, 27 | 2,106 | 2,328 | + 162 | 26 | 56,199 | + 3,518 |
| Hull Corporation ..... | ,, 27 | 2,925 | 3,202 | + 276 | 26 | 79,445 | + 3,921 |
| Ilford U.D.C. ..... | ,, 27 | 408 | 458 | + 50 | 26 | 11,931 | — 1,505 |
| Ilkeston Corporation ... | Oct. 1 | 124 | 147 | + 23 | 27 | 3,699 | + 617 |
| Ipswich Corporation ... | Sept. 27 | 453 | 526 | + 73 | 26 | 12,895 | + 448 |
| Isle of Thanet (..... | ,, 27 | 710 | 981 | + 271 | 51½ | 36,647 | + 2,095 |
| Kilmarnock Corp. ..... | ,, 27 | 168 | 171 | + 3 | 19 | 3.532 | + 252 |
| Lanarkshire ..... | ,, 25 | 1 682 | 1,815 | + 153 | 38 | 64,124 | + 7,587 |
| Lancashire United ..... | ,, 24 | 1,484 | 1,662 | + 178 | 38 | 58,924 | + 6,585 |
| Leeds City ..... | ,, 27 | 7,838 | 8,553 | + 683 | 26 | 217,150 | + 14,428 |
| Leicester Corporation... | ,, 27 | 2,701 | 3,136 | + 435 | 39 | 108,821 | + 10,206 |
| Leith Corporation ..... | ,, 27 | 669 | 767 | + 98 | 19 | 14.736 | + 498 |
| Liverpool Corporation.. | ,, 27 | 12,015 | 13,554 | + 1,539 | 38½ | 499,760 | + 37,801 |
| Llandudno &Colwyn B. | ,, 25 | 373 | 374 | + 1 | 43 | 15,925 | + 1,369 |
| London County Council | ,, 24 | 40,429 | 43,208 | + 2,779 | 25 | 1,062,273 | — 14,114 |
| London Gal. Omnibus.. | ,, 27 | 60,145 | 67,089 | + 6,944 | 39 | 2,423,233 | + 468 035 |
| London United ..... | ,, 26 | 6 380 | 6,926 | + 527 | 39 | 247.046 | + 2,432 |
| Lowestoft Corporation | ,, 27 | 210 | 243 | + 33 | 51 | 11,239 | + 540 |
| Maidstone Corporation | Aug. 14 | 205 | 212 | + 7 | 21 | 4.147 | + 204 |
| Manchester Corp. ..... | Sept. 27 | 17.241 | 18,871 | + 1,630 | 26 | 453,617 | + 23.192 |
| Mot. Elec. Trys. ..... | ,, 23 | 8,967 | 9,738 | + 771 | 39 | 351,940 | + 9,836 |
| Nelson Corporation .... | ,, 23 | 217 | 238 | + 21 | 26 | 5.649 | + 335 |
| N'castle-on-Tyne Corp. | ,, 27 | 4,388 | 5,158 | + 770 | 26 | 123,051 | + 11,202 |
| Newport (Mon.) Corp. .. | ,, 27 | 700 | 817 | + 117 | 23 | 20.034 | + 1,533 |
| New St. Helens & Dist .. | ,, 24 | 783 | 816 | + 33 | 13 | 11,579 | + 1,352 |
| Northampton Corp ..... | ,, 26 | 520 | 800 | + 240 | 26 | 15.499 | + 930 |
| Nottingham Corp. .... | ,, 25 | 3,115 | 3,407 | + 292 | 25½ | 85,333 | + 3,433 |
| Oldham Corporation ... | ,, 28 | 2,017 | 2.401 | + 384 | 27 | 59,855 | + 3,833 |
| Portsmouth Corp. ..... | ,, 27 | 1,934 | 2 173 | + 514 | 26 | 64,058 | + 3 449 |
| Preston Corporation ... | ,, 24 | 811 | 847 | + 36 | 26 | 23.178 | + 1,224 |
| Provincial ... .. ..... | ,, 30 | 1,877 | 2,137 | + 260 | 52 | 100,189 | + 6,874 |
| Reading Corporation ... | ,, 25 | 622 | 741 | + 119 | 25 | 18 051 | + 1,211 |
| Rochdale Corporation | ,, 27 | 1,537 | 1,635 | + 129 | 25 | 42,534 | + 1,593 |
| Rotherham Corp. ..... | Oct. 1 | 752 | 1,062 | + 310 | 26 | 26,244 | + 6,857 |
| Salford Corporation ... | Sept. 29 | 4 917 | 5,529 | + 532 | 26 | 137 554 | + 5,325 |
| Sheffield Corporation... | ,, 23 | 6,776 | 7,535 | + 809 | 27 | 195,637 | + 17.595 |
| Southampton Corp. .... | ,, 24 | 1,239 | 1,489 | + 250 | 25 | 35,022 | + 1,716 |
| Southend-on-Sea Corp. | ,, 24 | 847 | 1,085 | + 239 | 26 | 28,120 | + 4,483 |
| South Met. Trys. .... | ,, 28 | 855 | 1,255 | + 401 | 39 | 35.154 | + 1,907 |
| South Shields Corp..... | ,, 27 | 643 | 749 | + 106 | 26 | 19,291 | + 2,547 |
| Sunderland Corp. ..... | ,, 28 | 1,252 | 1,559 | + 307 | 23 | 38,849 | + 4 387 |
| Sunderland District ... | ,, 24 | 492 | 552 | + 60 | 47 | 25,853 | + 4,500 |
| Swindon Corporation .. | ,, 24 | 171 | 183 | + 12 | 25 | 4,329 | + 305 |
| Trys. (M.E.T.) 'Buses | ,, 27 | ... | 9,631 | ... | 35 | 162,143 | ... |
| Tyneside Trys.&Tmrds | ,, 24 | 532 | 517 | — 5 | 13 | 6,931 | + 479 |
| Wallasey Corporation | ,, 27 | 1,075 | 1,236 | + 161 | 26 | 33 491 | + 3 040 |
| Walsall Corporation ... | ,, 27 | 591 | 663 | + 72 | 39 | 24,161 | + 1,678 |
| Walthamstow U.D.C.... | ,, 27 | 670 | 792 | + 122 | 26 | 19,993 | + 15 |
| Warrington Corp ..... | Aug. 23 | 431 | 428 | — 3 | 23 | 9,649 | + 331 |
| West Ham Corporation | Sept. 25 | 2,579 | 2,783 | + 204 | 25½ | 70,000 | + 1,965 |
| Wigan Corporation .. . | ,, 25 | 1,364 | 1.559 | + 195 | 25½ | 37,830 | + 3,930 |
| Wolverhampton Corp | Oct. 1 | 1 071 | 1.188 | + 117 | 27 | 29,083 | + 1,679 |
| Yorkshire (W. Riding | Sept. 28 | 1,367 | 1,653 | + 286 | 39 | 58,686 | + 6,193 |

* From such of the services as were working both last year and this year the receipts show an increase of £3,914 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Sept. 27 | £4,954 | £4,408 | — £546 | 39 | £187,299 | + £9,048 |
| City and South London | ,, 27 | 2 901 | 2,647 | — 254 | 39 | 108,511 | — 10,135 |
| Liverpool Overhead..... | ,, 28 | 1,619 | 1,721 | + 102 | 39 | 67,078 | + 5,190 |
| London Electric..... | ,, 27 | 13,140 | 12,645 | — 495 | 39 | 527.440 | + 3.780 |
| Mersey ..... | ,, 27 | 2 410 | 2,429 | + 19 | 39 | 86,982 | + 5,018 |
| Metropolitan ..... | ,, 28 | 16,809 | 17 855 | + 1,046 | 39 | 665,427 | + 17,816 |
| Metropolitan District... | ,, 27 | 12,595 | 12,433 | — 162 | 39 | 502,859 | + 18,457 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, October 3. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 74 — 77 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4¼ — 4⅝ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅜ — 4⅝ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 92 — 94 |
| 100 | Do. 4% Deb. Stk. Red..... | + ½ | 96½ — 98½ |
| 100 | Do. 5% Deb. Stk. Red. ... | ... | 98½ —100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref ..... | ... | 31/32 — 1 1/32 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. ..... | ... | 70 — 75 xd |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11¼ |
| 100 | Do. do. 4½% Db. Stk. Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 1 | 95 — 96 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 7⅛ — 7⅝ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¼ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 99 —102 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¼ — 6¼ |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 6¼ — 7¼ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —103 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 1 | 124 —127 |
| 100 | Do. Pref. Ord. Stock ..... | — 2 | 110 —114 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | — 3 | 99 —104 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 —103 |
| 40 | Do. 4½% Vancouver Power Debs. ..... | — 1 | 98 —102 |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. ..... | — 3½ | 90 — 93 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 85 — 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... | + 1 | 50 — 53 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 12 — 14 |
| 100 | Do. Deferred Ord. Stock ..... | — ¼ | 4 — 6 |
| 100 | Do. 5% Perpetual Debenture Stock ..... | ... | 92 — 95 xd |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 76 — 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord ..... | ... | 6 — 6½ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ltd., ..... | ... | ⅛ — ⅜ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3½ |
| 100 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | — 1/16 | 5¾ — 5⅞ |
| 100 | Do. 4% Debenture Stock Red. 1905 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. .. | ... | 90¾ — 94¾ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1998) Lim. Ord. ..... | ... | — 10⅛ |
| 10 | Do. do. 6% Pref. ..... | — 1/16 | — 11¾ |
| 100 | Do. do. "A" Red. ..... | ... | — 82 xd |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79¾ |
| 10 | Gateshead & Dist. Trys. Co., Ord. ..... | ... | 8⅛ — 9 |
| 10/- | Hastings & Dist. Electric Trams. Co., Ltd., Ord. ..... | ... | 3/32 — 3/16 |
| 1 | Do. do. 6% Cum Pref. ..... | ... | ⅛ — ¼ xd |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 66 — 71 ,, |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. ..... | ... | 6¾ — 7 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 79 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2⅛ — 2⅜ |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | ⅞ — 15/16 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | ... | 25 — 35 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | ⅞ — 1 xd |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | + 2 | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 1 — 1⅛ |
| 1 | Do. 6% Cum Pref. ..... | ... | 1⅛ — 1⅜ |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — ⅜ |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | ... | 96 — 98 |
| 100 | Do Do 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref.... ..... | ... | 4⅝ — 5 xd |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 109 —112 xd |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1 3/32 — 1 5/32 |
| 100 | Metropolitan Elec. Trms. Ltd..4½% Deb Stock, Red. ... | ... | 88 — 86 |
| 100 | Do. do. 5% Deb. Stock, Red. ... | ... | 87 — 90 xd |
| $100 | Mexico Tramways Co., Common Stock ..... | + 2½ | 91 — 94 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 91 — 93 |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | ... | 93½ — 95½ |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) .... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd ..... | ... | 1⅛ — 1⅜ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6½ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 6 — 6¼ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. ..... | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. 5% Cum Pref. ..... | ... | ⅛ — ⅛ |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim.. Ord. ..... | ... | 3/32 — 5/32 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% ... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5¼ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 95 —197 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | — 2 | 83 — 85 xd |
| $100 | Rio de Janeiro Tramway Light and Power Co. ... ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | — ½ | 102 —103 |
| 100 | 5% 50-yr. Mort Gold Bonds ..... | — 3½ | 94 — 95 |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | — 2½ | 98 —100 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1939 ..... | ... | 102½ —104½ |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 9¼ — 10¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | + 1 | 86 — 90 xd |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅝ — ¾ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 68 — 72 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 87 — 89 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 89¾ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord. ..... | ... | 4⅝ — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4⅛ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ —100½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅛ — 5/16 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 3⅜ — 3⅞ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. ..... | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 18. | LONDON, SATURDAY, OCTOBER 11, 1913. | [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### GLAMORGAN COUNTY COUNCIL.

TO CONTRACTORS.

THE GLAMORGAN COUNTY COUNCIL (MORRISTON TO PONTARDAWE) LIGHT RAILWAYS ORDERS, 1903 AND 1913.

The Glamorgan County Council is desirous of negotiating with engineering firms of standing who are prepared to undertake to construct, and to work when constructed, a Light Railway of the character of a Tramway about five miles in length, from Ynysforgan to Pontardawe in continuation of the section of railway about five furlongs in length commencing at the Swansea Borough Boundary already constructed and now worked as an extension of the Borough Tramways by the Swansea Improvements and Tramways Company, but which will form a part of the completed undertaking.

Plans of the proposed railway may be seen at the Glamorgan County Hall, Cardiff, between the hours of 10 a.m. and 4 p.m. (Saturday 10 a.m. and 1 p.m.), and further information obtained from the undersigned.

T. MANSEL FRANKLEN,
Clerk of the Glamorgan County Council.

### EAST INDIAN RAILWAY.

The East Indian Railway Company is prepared to receive tenders for the supply and delivery of—

1. Steam Turbines and Condensers, etc.
2. Turbo-Alternators.

As per specifications to be seen at the Company's Offices.

Tenders are to be sent to the undersigned, marked "Tender for Steam Turbines, etc.," or as the case may be, not later than 11 o'clock a.m., on Wednesday, the 29th day of October instant.

The Company reserves to itself the right to divide the order, also to decline any tender without assigning a reason, and does not bind itself to accept the lowest or any tender.

For each specification, a fee of £1 1s. is charged, which cannot under any circumstances be returned.

By order, C. W. YOUNG,
Secretary.

Nicholas Lane, London, E.C.,
October 9, 1913.

### SALE URBAN DISTRICT COUNCIL.

Tenders are invited from manufacturers for the supply, delivery, and erection of

A. Storage Battery.
B. Battery Charging Booster.

Specification and particulars can be obtained from Mr. C. J. Wood, Electricity Works, School Road, Sale.

The Council do not bind themselves to accept the lowest or any tender, and any acceptance will be subject to the sanction of the Local Government Board to a loan being obtained. Tenders to be in by 10 a.m. October 23, 1913.

D. HALLEWELL,
Clerk to the Council.

### CITY OF BRADFORD.

TRAMWAYS DEPARTMENT.

TENDERS FOR GENERAL STORES.

The Bradford Corporation are prepared to receive tenders for the supply of Miscellaneous Stores required by the Tramways Department during the year ending December 31, 1914, as follows, viz.:—

Schedule No.

1 Bolts, Nuts, Screws, Washers, Nails, Cotter Pins, Rivets, Brass Rod, Lead, Hack Saw Blades, Twist Drills, and Miscellaneous Ironmongery.
2 Files.
3 Lamp Fittings.
4 Insulating Material, Tapes, and Calico.
5 Sand Bags.
6 Copper Fuse Wire.
7 Iron, Malleable, and Steel Castings.
8 Phosphor Bronze, Gun Metal, and Brass Castings, Copper Controller Finger Contacts, and Drivers' Alarm Bells.
9 Insulated Bolts and Strains.
10 Bar Iron and Steel, and Galvanised Steel Sheets.
11 Oils and Grease.
12 Paints, Dry Colours, and Shellac.
13 Spirits and Acids.
14 Drysaltery and Disinfecting Fluid.
15 Paint Brushes and Cleaning Brushes.
16 Waste, Sponges, Washleathers, Cleaning Cloths, and Soap.
17 Transfers and Gold Leaf.
18 Glass.
19 Steel Pinions.
20 Delivery Hose, Indiarubber, Vulcanite Fibre, and Insulating Paper.
21 Timber.

Schedule and conditions of tender may be had on application at the Tramway Offices, 7, Hall Ings, Bradford, on payment of the sum of one guinea, which amount will be refunded on receipt of a *bonâ-fide* tender. (Cheques to be made payable to the order of the Bradford Corporation.) The contracts will be let subject to the Fair Contracts Clauses of the Corporation.

Samples can be inspected at the aforesaid Tramway Offices. Tenders endorsed "Tender for Stores," to be sent to me not later than Saturday, the 18th instant. The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
October 1, 1913.

### COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee invite tenders for the following:—

1. One 2,000 kw. Turbo-Alternator, Condensing Plant, Pumps, Piping, and Fittings.
2. One Water-Tube Boiler, Mechanical Stokers, Superheaters, etc.

Specifications and forms of tender may be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a *bonâ-fide* tender. Five shillings will be charged for extra copies of specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee, Town Hall, Warrington," must be sealed with wax and endorsed "Tender for Turbo-Alternator" or "Boiler," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, October 28, 1913.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

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## CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

TENDERS FOR UNIFORM CLOTHING AND CAPS.

The Tramways Committee are prepared to receive tenders for the supply of Uniform Clothing and Caps for the Inspectors, Motormen, and Conductors.

Forms of tender may be had on application to the undersigned at the Tramway Offices, The Council House, Congreve Street, Birmingham. Tenders must be made on the form provided, and must be handed in not later than 12 o'clock noon on Monday, the 10th day of November, 1913.

The Committee do not bind themselves to accept the lowest or any tender.

Persons tendering must at the time of tendering and at all times during the execution of the works be paying all their workpeople not less than the standard rate of wages in the districts where such workpeople are actually engaged in the execution of the work, and must be observing the hours and conditions of labour recognised by the Associations of Employers and the local organised bodies of workers in the various trades in such districts. The contractor will be held responsible for the observance of these conditions by any sub-contractor employed by him.

The contractor must also agree to comply with and conform to the provisions of the Trade Boards Act, 1909.

ALFRED BAKER,
General Manager.

The Council House,
Congreve Street, Birmingham.

## NEWCASTLE-UPON-TYNE CORPORATION TRAMWAYS.

UNIFORM CLOTHING.

The Tramways Committee of the above Corporation invite tenders for the supply of Uniform Clothing for Inspectors, Time keepers, Depôt Clerks, Motormen, Conductors, and Overhead Linesmen, etc., for the twelve months ending March 31, 1915.

Form of tender and conditions of contract can be had on application to the undersigned.

Specimen uniforms can be seen at the Tramway Offices, Manors, Newcastle-on-Tyne.

Tenders must be sent through the post, addressed to the Chairman of the Tramway Committee, endorsed "Tenders for Uniforms," and must be delivered not later than November 4, 1913.

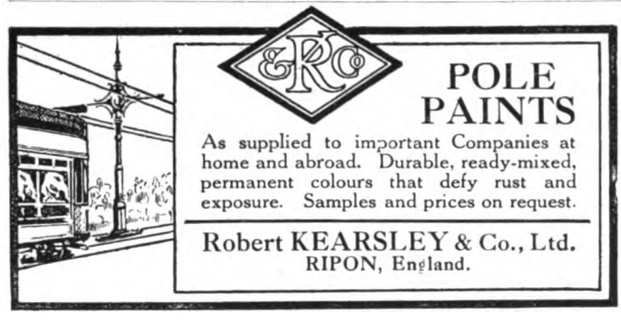
The Tramways Committee do not bind themselves to accept the lowest or any tender.

ERNEST HATTON,
Engineer and General Manager.

Tramway Offices,
Manors, Newcastle-on-Tyne,
October 6, 1913.

(*Continued on page 287.*)

Advertiser wishes to dispose of his copies of the illustrated issues of TRAMWAY AND RAILWAY WORLD from August, 1904, to September, 1909; perfect condition. Box 61, TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, W.C.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THE
# Tramway AND Railway World

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SATURDAY, OCTOBER 11, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## BIRMINGHAM'S LEAD IN OMNIBUS TRACTION.

If the scheme for the acquisition of the undertaking of the Birmingham and Midland Omnibus Company by the Corporation becomes an accomplished fact, Birmingham will become the operators of the chief municipal omnibus service. At present about a score of municipalities are either running motor-omnibuses or have obtained powers to do so, but in no instance are their services on so large a scale as those of the Birmingham Company, which is an offshoot of the local Tramway Company, the last of whose lines passed into the hands of the Corporation about a year ago. Before the transfer was effected the authority had willingly granted facilities for running omnibuses, but on one or two routes these vehicles have been succeeded by tramways. The desire of certain residential districts to retain omnibus facilities led to opposition to tramway proposals submitted to the Legislature, and a numerous party in the Corporation has strongly advocated the employment of the omnibus. The outcome of this championship of the self-propelled vehicle is seen in the acquisition by the Tramways Committee during the past year of several such conveyances in pursuance of their powers to run them in extension of tramway routes, and also in the decision arrived at a week ago to apply for general running powers. When this scheme has received the sanction of Parliament clashing would inevitably ensue between the Corporation and the Company, and in order to avert that contingency, the Tramways Committee, acting on the advice of their tramways manager, Mr. A. Baker, have wisely advised the Council to buy the omnibus undertaking. The purchase price has been fixed at £30,600, including the garage, which provides accommodation for nearly eighty vehicles and the complete plant for the repair of the fleet. Of the forty-nine double and single-deck machines owned by the company it is proposed to acquire thirty double-deck cars. When the announcement of the Committee's recommendation was made on October 4 an important point remained to be settled, viz., as to the running by the company from places outside the city to the centre of Birmingham, the Committee desiring to prevent competition with their tramways or any service of omnibuses they may set up between points inside the boundaries. The Committee suggest the fixing of a minimum fare for the company's omnibuses coming into and going out of the city, while the company claim that the amount should be much less than is suggested by the Committee. The point is an important one for the company, for they contemplate extending their services to all the important towns and districts within a twenty-mile radius and to some places beyond that distance. When this scheme is carried out the undertaking from its purely omnibus side will be second only to that of the London General Omnibus Company; indeed, it will serve a larger population outside of London than is the case with the latter. During the course of the next year or so similar enterprises may be looked for on the part of the motor-omnibus undertaking of the British Electrical Federation and of another company. An important lesson is to be derived by tramway undertakings from those enterprises and from the action of the Birmingham and other Corporations who have instituted motor services during the past twelve months. It is that while there are many localities to which tramway extension would not prove profitable, the motor omnibus can be used to test routes for both rail and railless electric cars, and to bring traffic to the tramways. Evidence that municipalities are more and more appreciating the value of the motor-omnibus is given in our news columns this week.

## A TRAMWAY AND RAILLESS COMBINATION.

The system of tramways and railless trolley routes belonging to Aberdare Urban District Council, the formal inauguration of which for public service took place on Thursday, forms the first systematically combined scheme of the sort conceived, constructed, and opened as one undertaking. The Glamorganshire Valley, in which the undertaking is situated, is, like others in South Wales, a hive of industry, coal mines and iron and other works being dotted along it. The centre of the locality is Aberdare itself, with a population of over 50,000, but industries straggle out to the south-east and north-west, and villages require connection with the town. There is no scarcity of railways in the district, and these are largely engaged in the coal traffic. Additional means of communication of a local kind was, however, felt desirable, and this led to the combined scheme of the District Council, which has now reached fruition. The combination of tramway and trackless trolley is thoroughly well suited to the locality. There is one through tramway route, single track with passing places, from Aberaman in the south-east through Aberdare to beyond Trecynon in the north-west, a distance of 2¾ miles. The depôt and the electricity station are in the centre of Aberdare. This trunk tramway line is fed by and acts as a distributor to four trackless trolley routes on the Cedes-Stoll system which run through outlying districts. From the southern end of the tramway one of these routes extends nearly a mile further south-east to a village called Capcoch. From the same point a second railless route reaches south-westwards up a side valley for a mile and a quarter to the village of Cumaman. In the centre of Aberdare the tramway sends off another railless spur north-eastwards

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for nearly a mile to Abernant, while finally the tramway is continued from its north-western terminus by a trackless route for half a mile to Cwmdare. The total length of the trackless routes is thus 3½ miles. The point we desire to emphasise is the admirable sufficiency of the combined scheme to meet the wants of the district. The towns and villages are narrow in proportion to their length, so that no considerable population is to be found at any great distance laterally from the tramway or from the railless routes. Moreover, a scattered population, employed in mines and works, is to be found all along the railless routes, while at the same time the termini of the latter reach to what may be called the ends of the populated districts. Beyond these termini open country extends for considerable distances, though to the north-east Merthyr Tydvil is not so far away, and to the south-east a few miles distant is Mountain Ash. To these the north-east and south-east railless routes might be extended some day. But for the present we have a self-contained combined system, constructed at small cost and calculated to serve the population in a way which no other could do. The inauguration was highly successful, and the District Council, Messrs. Stephen Sellon and Partners, and the Cedes Electric Traction Company, as well as the local public, are alike to be congratulated on the completion of a really useful and efficient undertaking.

## ABERDARE TRAMWAYS AND RAILLESS TRACTION.

Inauguration Proceedings.

The electric tramways and railless trolley routes on the Cedes-Stoll system belonging to Aberdade Urban District Council, to which we briefly referred last week, were formally inaugurated on Thursday last. Members of the District Council, together with representatives of Messrs. Stephen Sellon and Partners, the consulting engineers, and of the Cedes Electric Traction Company, attended the opening run made by the cars, and everything passed off to the satisfaction of the gentlemen present. Later in the day the District Council and officials were entertained at dinner by the consulting engineers. The proceedings were presided over by Mr. T. Walter Williams, chairman of the council, supported by Mr. T. Ingliss Rudman, resident engineer, Mr. Beverley Griffin, and Mr. T. Williams, representing Messrs. W. Griffiths and Company, and Mr. J. Parkinson, representing Messrs. Clough, Smith and Company.

Mr. Beverley Griffin, in proposing prosperity to the town and trade of Aberdare, said that the events of the day showed that Aberdare was a progressive town, and he hoped that it would progress a little further so that the scheme might be extended to Mountain Ash, four miles away. Means of access to important towns meant a great deal in the way of commercial prosperity, and enabled the towns to keep abreast of the times.

The Chairman, in reply, said that the Council had taken an important step for the future of Aberdare. They had just concluded arrangements for an increased supply of water. He was of opinion that they depended too exclusively on the coal trade, but by providing electric power in the town they would encourage other trades and manufactures, and would enable small men to compete with larger ones.

Councillor L. N. Williams, in submitting the toast of "Success to the Aberdare Tramways," thanked Mr. Sellon for the invitation to the present function. They had seen a united send-off to the Aberdare tramways that day. For a long time they had been hoping to see tramway cars traversing the streets of Aberdare. During the construction there had been some misgivings and friction, but not, he thought, from selfish motives. Their duty was to make the best of the tramways and to study economy on all sides, and the system would become a boon and blessing to all. He expected that before long the tramway profits would reduce the rates of the district.

Councillor A. P. Jones, in response, referred to the difficulties which had been experienced in inaugurating what was for them a great public convenience. From appearances that day he was assured of a great success for the undertaking.

County Councillor William Thomas, in submitting the health of the contractors, said that all appreciated the great work which had been carried out during the past year. He had attended many troublous meetings, but he now felt recompensed. To the contractors the work, no doubt, had been a small one, but to the district it was great. The contractors told him that they never had a smoother run in their lives than that over the Aberdare tramways, and that these were bound to be successful. Personally he felt that the Aberdare tramway scheme was safe in the hands of Mr. Sellon. The contractors had met difficulties, but the Council were perfectly satisfied with what had been done. He wished the contractors every success.

Mr. Beverley Griffin, in response, said he was glad to see the consummation of the work. Their difficulties arose mostly from the weather, and he was pleased to say that there had been less grumbling in Aberdare than they had experienced elsewhere. He hoped the tramways would be even more successful than they anticipated.

Mr. Stephen Sellon, in proposing "Our Guests," said that life had many disappointments and vexations, but that did not debar them from showing friendly hospitality. Aberdare, apparently dead, had been wakened up to practical existence by electric tramways. He was pleased to see so many people who had the governing of Aberdare at heart, and he was especially pleased to see Aberdare placed above other districts, which from pure jealousy would proceed to copy Aberdare.

## DAIMLER ALLIANCE WITH THE L.G.O. WORKS

Sir Hallewell Rogers, in moving the adoption of the report presented to the shareholders of the Birmingham Small Arms Company at the annual meeting held on October 8, mentioned that the Daimler Company during the past year made a net profit, amounting in round figures to £128,000, on an investment which stood in the balance sheet at only £351,000. This might be regarded as very satisfactory, and he might further state that the aggregate profits of the Daimler Company for the four years during which they had owned that company had been upwards of £430,000. The extensions of the works which were now needed were the result of the adoption of a very progressive programme in the development of commercial vehicles and chassis for omnibuses. He was glad to be able to tell them that they had concluded arrangements which, while enabling this part of the business still to progress, was not likely to make for some years to come any further demands upon the capital resources of the company. The arrangement in question was a working alliance between the Daimler Company and the manufacturing undertaking connected with the London General Omnibus Company, known as the Associated Equipment Company, whereby omnibuses and certain sizes of commercial vehicles, for which there was a large demand, would be made at the factory of that company. The factory was, perhaps, the most modern one which had been constructed, and was on a very considerable scale, enabling any possible demands for that particular vehicle which they could forsee to be adequately and quickly met by that company for them. Incidentally another advantage accrued to the company from this alliance in removing from the field of competition an undertaking which would otherwise undoubtedly secure a large proportion of the orders going, having regard to its great and unique experience in the manufacture and operation of this class of vehicle. The London General Omnibus Company were operating a large number of omnibuses manufactured by the Daimler Company, and as a result of their experience with these vehicles had placed an order for a considerable number of Daimler sleeve valve engines for use with the General Omnibus Company's fleet. A satisfactory feature of this arrangement was that it enabled the Daimler Company to devote the resources of the existing works to the manufacture of types of commercial vehicles other than those to be made at the Associated Equipment Company's works, and at the same time enabling them to share in the profits.

Mr. E. Manville, in seconding the motion, emphasised the advantage of the arrangement which had been come to with regard to the acquisition of the output of another large factory, saving them, as he hoped, further expenditure on the Daimler side for many years.

The following dividends were agreed to:—On the preference shares at the rate of 2½ per cent., less income-tax, amounting to £4,782 0s. 0d.; on the ordinary shares at the rate of 5 per cent., together with a bonus of 1s. per share, free of income-tax, amounting to £76,608 4s. The sum of £10,000 is carried to the general reserve fund and £50,000 to machinery reserve fund.

## THE BADGE QUESTION AT NOTTINGHAM.

Nottingham Tramways Committee on October 7 received a deputation from the local branch of the Tramway and Vehicle Workers' Union, who asked for some provision to be made to protect the motormen from the rigours of the winter; the abolition of the bonus system; and permission to wear the union badge. The committee consented to receive a deputation on the first two points, but said they could not sanction the third proposition. Councillor R. H. Swain, the chairman of the Tramways Committee, afterwards stated that for some time he and Mr. J. Aldworth, manager, had been considering a "merit" scheme, and this would be introduced at the end of the year. The question of current would be one of the principal items in that scheme, but the details had not yet been completed. As to the wind screens, their provision would be seen to at once. The screens would be of canvas. A trial was made some time ago with canvas, and it was hoped that the new arrangement would prove satisfactory. "So far as the request for the wearing of the button is concerned," said Mr. Swain, "we have refused, as before." The men's executive met on the following day to receive the report and decide what course should be recommended to the quarterly meeting next Monday. The ballot resulted in an overwhelming majority for wearing the badge with or without the committee's consent.

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## MISCELLANEOUS NEWS AND NOTES.

**Grimsby and Covered Tops.**—The Tramways Committee have been directed to consider the question of asking the Tramways Company to convert all their open top deck cars into covered tops.

**New Cars for Leeds.**—The Leeds Tramways and Electricity Committee propose asking the Board of Trade for sanction to borrow £45,600 for the purpose of providing new tramcars for the city. It is also intended to apply the side life-guard to the whole of the cars.

**Bradford Developments.**—It is proposed to erect a new and larger district depôt at the junction of Bolton and Idle Roads for the tramways department, and to provide additional car accommodation at Thornbury.

**Mud Splashing by Motor Vehicles.**—Camberwell Borough Council have asked the London County Council to obtain a by-law for the prevention of mud splashing by motor vehicles, the shopkeepers and pedestrians having frequently complained.

**Tramcar Ventilation.**—Bournemouth tramways manager has informed the Tramways Committee that he has arranged a simple method for ventilating the cars. As the result of their inspection of two cars so fitted, the committee have approved the arrangement.

**Protecting Tramway Passengers.**—For recklessly driving a horse and lorry past a number of people who were boarding and leaving a tramcar at Peel Street, Glasgow, a driver was at the Partick Police Court on October 7 ordered to pay £5, or go to prison for 30 days.

**Omnibuses for Municipalities.**—Lancaster Council have resolved to apply for Parliamentary powers for running motor omnibuses within the borough, and Coventry Tramways Committee have recommended the Corporation to purchase six omnibuses at a cost of £2,600.

**Inter-Running at Sunderland.**—The Tramways Committee have decided to apply for a provisional order for running powers to enable the District Tramway Company to run cars from Houghton to Fawcet Street. The District Company will bear the expense of the arrangements.

**A Remedy for Galloping.**—The Devonport and District Tramways Company have informed the Town Council that new trucks have been ordered for all cars numbered above 30, and it is hoped that when the new trucks are fixed the galloping, which is now fairly noticeable, will be done away with.

**A Special Tramcar for Creche Babies.**—The proposal for a special morning tramcar to take babies from the centre of Bury to the Whitehead crèche has for the present been abandoned. The proposal was tried on October 6, but only one child was given into the custody of the nurses who were in attendance to meet the mothers.

**Illuminated Route Indicators.**—The Potteries Electric Traction Company have decided to place time indicators at the Trent Vale and Dresden termini, but have informed Stoke Council that they are unable to install illuminated route indicators. The company added that they are experimenting with a device which they hope will meet the situation.

**Linking Up of the Swansea Tramway Routes.**—Major Pringle, of of the Board of Trade, has approved of the working of the new lines laid down by the Swansea Tramways Company for the purpose of linking up the various routes. While one of the two cars used on the occasion of the inspection was passing round the corner of Castle and Temple Streets the head of the trolley pole broke.

**The Season at Blackpool.**—The tramway receipts for the six months just ended amounted to £67,713, against £57,134 for the corresponding period of last year. As showing the influence of the illuminations along the promenade the receipts for the week ended October 4 showed an increase of £752 compared with the corresponding week of last year, and constituted a record for that period of the year.

**Over-Assessment of Tramways for Income-Tax.**—Report has been made to the Bournemouth Tramways Committee by the Borough Accountant that the claim made by the Council for refund of income-tax in consequence of over-assessment under Schedule D in respect of the three years ended April 5, 1911, had resulted in a repayment of £1,761. The committee have agreed that this sum be applied, £1,000 to a reserve fund and £761 to the renewals fund.

**More Omnibuses for Liverpool.**—Proposals are under consideration by the Tramways Committee for purchasing additional omnibuses in order to extend the services to districts not at present provided with means of locomotion. On October 6 the type of vehicle in use by the Sheffield Tramways Committee was inspected at Liverpool and tested on a route which included the Erskine Street hill. Other types of vehicle are also to be inspected.

**Birmingham Resisting Overhead Telephone Wires.**—The Birmingham stipendiary magistrate is hearing a series of test cases brought by the Corporation against the claim of the Postmaster-General to erect overhead wires for the development of the suburban telephone service. It is understood that the matter will be carried to appeal if necessary. An offer was made that when the number of overhead wires on a route exceeded 32, the service for 16 subscribers, underground communication would be substituted.

**Trail Cars on Aberdeen Suburban Tramways.**—Application has been made to the Board of Trade by the Aberdeen Suburban Tramways Company for permission to run passenger trail cars. The County Road Board have informed the Board of Trade that in their opinion the object which the company wished to obtain could be achieved by a more frequent service of cars, while the Aberdeen Tramways Committee have intimated to the Board of Trade that there is no loop on the company's line at the Mannsfield terminus suitable for handling trailers.

**Proposed Additional P.A.Y.E. Cars for Aberdeen.**—The Tramways Committee on October 3 opened tenders for the electrical equipment of six additional cars. It was resolved not to accept any offers at the present, but to obtain amended tenders from two of the firms. A report by Mr. Pilcher, general manager, on the P.A.Y.E. cars was submitted and considered. It was agreed to take no action until the committee had had time to inspect a wider staircase, which is being constructed at the tramways workshops.

**Bermondsey and Motor Omnibus Dangers.**—Bermondsey Borough Council having considered "the appalling and continuous slaughter of children in the borough by motor omnibuses," have decided to ask the Local Government Board to issue an order restricting the speed of motor vehicles to eight miles an hour through the main thoroughfares from London Bridge to Deptford Lower Road, and from the Bricklayers' Arms, Old Kent Road, to Deptford Lower Road. The streets are narrow and winding, with several abrupt turnings. In twelve months nine persons have been killed and seventy-three injured by motor traffic.

**Bournemouth and the Rating Appeal.**—The chief assistant overseer has called the attention of the Finance Committee of Bournemouth Borough Council to the effect of the recent decision in the House of Lords as to the rating of tramways—viz., that the general district rate for the tramways would be charged in full, instead of at the quarter rate for the running lines and appurtenances. He pointed out that a deduction of £712 10s. was made from the rates on the tramway undertaking for the year ended March 31 last, and that this sum had been allowed as irrecoverable and passed by the auditor. The committee decided that the current rate be amended under Section 221 of the Public Health Act, 1875, and the increased rates charged as from April 1, 1913.

**First Petrol Tramcar in Scotland.**—The Lanarkshire Motor Company, of Glasgow, have fitted a tramcar with a petrol engine. It is to be operated by the Stirling and Bridge of Allan Tramway Company, the last of the horse-drawn tramcar undertakings in Scotland. The car, which was tested on the Glasgow Corporation tramways, holds 20 passengers inside and 24 outside. The four-cylinder engine develops 25 h.p., and it is cooled by a radiator placed on the roof. The drive is through a three-speed gear box to double bevels lying centrally between the axles, and by means of a double sprocket the drive is taken to both axles. The car can be driven in either direction. The brakes are operated by foot and hand levers, and the driver is seated.

**London Police and the Stopping Places of Omnibuses.**—In reply to representations made by Ilford Tramways Committee, the Commissioner of Police has informed them that the police had instructions to prevent, as far as possible, motor 'buses and tramcars from stopping level with each other, and also to see that the slow-going traffic was kept as much as practicable to the near side of the road. Renewed attention had, however, been called to the matter, and the police would continue to do all in their power to obviate danger to pedestrians and obstruction to traffic. At the meeting at which the communication was received Councillor Golightly said he had seen three 'buses line up at Stratford Market with the evident intention of preventing people getting on the cars.

**The Arbitration Difficulty at Sheffield.**—It will be remembered that the Sheffield tramways employees although willing to submit to an arbitrator their difference with the Tramways Committee as to time and a half pay for Sunday duty, were unable to agree to the terms of reference drawn up by the Town Clerk for consideration by Judge Benson. The general manager has now received a letter from the Association of Tramway and Vehicle Workers stating that they would prefer to leave the case in the hands of the Tramways Committee, but they asked the committee to consider an application on behalf of certain employees not already in receipt of time and a half pay for Sunday after five years' service with the department. The general manager has been directed to report on the request.

**Newport to Apply for Motor Omnibus Powers.**—The Tramways Committee on October 7 decided to recommend the Council to apply for powers to run motor omnibuses on nine routes. This decision was arrived at after consideration of a report on additional means of transport in the borough and adjacent districts by Messrs. N. J. Young, general manager of the Electricity and Tramways Department, and A. Nicholls Moore, the electrical engineer. The report pointed out that a company had already obtained Parliamentary powers for running a system of railless cars in an adjacent area, and propose extending the service to within the borough. Messrs. Young and Moore suggested that the Corporation should maintain the monopoly they now enjoy within their own boundaries, and also advised extension. They pointed out that the motor 'bus had so far found most favour for such work.

## CONTRACTS AND ORDERS.

**United Electric Car Company,** of Preston, have received a contract to supply two top-deck covers for cars to Lancaster Council.

**Maudsley Motor Company,** Coventry, have received a contract from the City Council for the supply of six 40 h.p. omnibuses, at £730 each.

**Blackpool Council** have sealed a contract with Richardsons, Westgarth and Co. for the supply of a 1,000 kw. turbo-generator and condensing plant.

**Bury Council** have accepted the tender of J. Musgrave and Sons for the supply of a 3,000 kw. turbo-alternator with exciter and surface condenser.

**Dundee Tramways Committee** have accepted the tender of Mr. D. Horsburgh for excavating, concreting, and paving, etc., the road in connection with the extension of the Blackness Road tramways, at £6,471.

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**Derby Council** have accepted the following tenders:—British Thomson-Houston Company, Limited, switchgear, £943; Simkiss and Knighton, cast-iron piping for turbine, £246; Alton and Co., steel piping for turbine, £142; Newton Bros., balancer, £179.

**Thermit, Limited,** have on hand at the present time tramway rail welding contracts at Bradford, Burnley, Brighton, Bournemouth, Dublin, Dundee, Huddersfield, Leeds, Liverpool, London County Council (four contracts), London United Tramways, Manchester, Sheffield, Southampton, etc.

**Messrs. Belliss and Morcom and Siemens Bros.** have supplied the turbine and generating plant installed in the Croydon Corporation electricity station. The capacity is about 3,000 h.p. and the cost £7,000. The turbines can be worked either with high-pressure steam or with exhaust steam, and a great saving in the coal bill is thereby anticipated.

**Sheffield Council** have accepted the following tenders:—Tramway tie bars and anchor joints, Bayliss, Jones and Bayliss, Limited, Dorman, Long and Co., Limited; tramway rails, Steel, Peech and Tozer, Limited; e.h.t. switchgear at Neepsend Station (extension of contract by four additional panels), A. Reyrolle and Co., Limited, Hebburn-on-Tyne, at £2,453.

**Hurst, Nelson and Co.** have received a contract from Leeds Corporation for the supply of tramcar bodies and trucks, at £12,850. Alderman Tetley informed the Council that their own car works could not turn out the cars sufficiently quickly, and that this tender was practically the lowest one received. Tenders for the erection of a car shed at Beckett Street are to be advertised for.

**Cardiff Council** have accepted the tender of Messrs. Fraser and Chalmers for a turbo-generator for the Roath Power Station at £6,345, and the tender of the British Westinghouse Company for a 1,000 kw. rotary converter, for the Hayes sub-station, at £1,055. Mr. A. Ellis, the electrical engineer, recommended the purchase of the 1,000 kw. converter instead of a 700 kw. plant, as the larger one would ultimately effect a saving in cost and space.

**Glasgow Tramways Committee** have awarded contracts as subjoined:—Steel traction poles, Stewarts and Lloyds, Limited; copper collector bushes, General Electric Company, Limited; motor gear cases, Electrical Engineering and Equipment Company, Limited; bastian radiators, Gillespie and Beales; lighting fittings, Falk, Stadelman and Co., Limited; supplying and fitting up an electric clock at the junction of two roads, W. Silversteer and Co.

## PERSONAL.

**Mr. Frank Buckley,** tramways manager to Wigan Corporation, has been granted an increase in salary of £25 per annum.

**Sir John Courtis,** chairman of Cardiff Tramways Committee, was welcomed by the members on October 7 on his return from his Canadian tour.

**Mr. Alfred Clough,** late resident electrical engineer to the Liverpool Corporation, has been presented with two divan chairs and an illuminated address by the electric supply department. The presentation was made by Alderman Fred Smith, chairman of the Tramways and Electrical Power Committee, who was supported by Mr. C. W. Mallins (tramways manager), Mr. H. Dickinson (city electrical engineer), etc.

**Mr. H. S. Banner** has been appointed an inspector on the Southport Corporation tramways. Mr. Banner entered the service in May, 1902. In March, 1906, he was granted a merit badge for neat appearance, attention to passengers, and general good conduct. These badges, which are not now awarded, carried with them an additional 1s. a week. In 1907 he was appointed a motorman, and in January, 1910, he was made deputy inspector.

**Mr. G. Cardwell,** general manager of the Devonport and District Tramways Company, as briefly reported in our last issue, was presented with a silver tea and coffee urn by the staff and employees on the occasion of his marriage. The presentation was made at a dinner and smoking concert, Inspector Murton presiding. Acting Chief Inspector Goodridge made the presentation, and on behalf of the staff wished Mr. and Mrs. Cardwell the best of health. Mr. Cardwell thanked the donors for their kindness.

**Mr. T. B. Holliday,** general manager and electrical engineer to the Hastings and District Tramways Company, was reported at a meeting of the Town Council on October 3 to be ill. He had, however, supplied the following figures showing the increase in the number of passengers carried by the company:—Year ended August 11, 1913, 8,695,813; 1912, 8,476,681; increase, 219,132. Six months ended August 31, 1913, 4,908,097; 1912, 4,524,223; increase, 383,874. Month of August, 1913, 1,224,223; 1912, 1,070,000; increase, 154,223.

**Sir Wm. Clegg,** chairman of the Sheffield Tramways Committee, took part in a discussion by the City Council on October 9 on a report from the Tramways Committee recommending the Corporation not to adopt proposals made by trade unions that all Corporation employees shall be members of trade unions, and that all firms employing non-union labour in departments affected by Corporation contracts shall be excluded from tendering for contract work. Sir William supported a proposal to refer the matter back in the hope that a modified resolution might be arrived at. It might, he suggested, be made a basis for discussion that when vacancies arose preference should be given to trade unionists, all things being otherwise equal. The committee agreed to receive a further deputation.

**Mr. J. S. D. Moffet,** who, as recorded in our issue dated October 5, was presented with a canteen of cutlery on leaving the managership of the Rochdale tramways to take up similar duties at West Ham, was the subject of some complimentary remarks made by the chief officials of the Corporation. The Town Clerk (Mr. W. H. Hickson) referred to the able assistance he received from Mr. Moffet in connection with Parliamentary Bill work, especially that relating to the extension of the Whitworth section and to the Bury Corporation Bill. Mr. L. S. Platt, borough surveyor, mentioned that Mr. Moffet came to Rochdale as one of his assistants. He paid tribute to the efficiency with which he superintended the construction of the tramways in the borough and adjacent area. Having been so closely associated with the initial work, following the municipalisation of the system it was fitting that Mr. Moffet should obtain the general managership. All through the years of Mr. Moffet's service in Rochdale they had been in most friendly co-operation.

**Dinner to Mr. and Mrs. Wyld.**—Mr. W. Wyld (late manager of the Birkenhead Electricity Supply Company and Tramway Department) and Mrs. Wyld were entertained by a number of friends to dinner at the Imperial Restaurant, Regent Street, W., on October 3, to welcome them to London and to congratulate Mr. Wyld on his appointment as borough electrical engineer to Hampstead Corporation. The chair was taken by Mr. H. E. Blain, who, after the loyal toast, proposed the health of the guests. Mr. Wyld responded, and gave an amusing biographical sketch of his career. Commencing with Blackpool, he took the company in imagination to Salford, Wednesbury, Doncaster, and Birkenhead, finally landing them at Hampstead, with which he expressed great satisfaction. An impromptu speech was made by Mr. Harry England (Wakefield). The health of the chairman was proposed briefly by Mr. C. Newton Russell. Mr. Barfield (hon. sec.) and Mr. Barallet (hon. musical director) also contributed short speeches.

## FINANCIAL REPORTS AND MEETINGS.

**Anglo-Argentine Tramways.**—The directors have declared an interim dividend of 4 per cent., less income-tax, for the half-year ended June 30.

**Calcutta Tramways Company.**—An interim dividend at the rate of 5 per cent. per annum (2s. 6d. per share), free of income-tax, on the ordinary shares for the past half-year is announced.

**Hurst, Nelson and Co., Ltd.**—The profits for the past year were £61,057. The directors recommend that the preference share dividend be paid to November 11 next, that £5,650 be reserved to provide for the following half-year's dividend, that £10,000 be added to the reserve fund for security of dividends on preference shares, and that a distribution of 5s. per share be made on the ordinary shares, free of tax, leaving £2,257 to be carried forward.

**Record Half-Year at Leeds.**—The earnings of the Leeds tramways for the half-year ended September 30 amounted to the record total of £223,059, an increase of £14,581 as compared with the total for the corresponding half of the last financial year. The passengers carried numbered 47,996,569. The district served by the tramways comprises a population of 525,000, and the average amount expended in car fares per head of the population during the half-year is calculated at 8s. 5d.

**The British Electrical Federation.**—The traffic statement for the week ended October 3, 1913, shows that the receipts from tramways and railways amounted to £42,864, as compared with £38,335 in the corresponding week last year, and from omnibuses £3,072, as compared with £1,195, making a total of £56,536, as compared with £39,530. The tramway and railway route mileage was 429.82, as compared with 431.52. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working, both last year and this year, the receipts show an increase of £4,706 upon the week.

**The Half-Year at Bradford.**—The tramway receipts for the half-year ended September 30 show that the receipts amount to £158,622, as compared with £147,901 in the corresponding half of 1912. This is an increase in receipts of £10,721, or 7 per cent. The car miles run were 3,156,070, as compared with 3,033,869, an increase of 122,201 miles, or 4 per cent. The passengers carried during the half-year numbered 34,227,530, as against 31,009,972 in the corresponding six months of last year, an increase of 3,217,558, or 10 per cent. The cost per car mile has increased owing to the advance of wages to practically every member of the staff, the payment of full sickness benefits to men who are absent from duty owing to illness, and track maintenance costs.

**Deficit on New South Wales Tramways Working.**—The report of the Chief Commissioner of the New South Wales Railways and Tramways for the year ended June 30, 1913, gives the following figures in regard to the tramways:—

| | | Increase over last year. |
|---|---|---|
| Revenue ... ... | £1,754,566 ... | £173,173 |
| Expenditure ... ... | £1,572,190 ... | £246,777 |
| Passengers carried ... | 204,445,452 ... | 27,665,606 |
| Tramway mileage ... | 26,054,767 ... | 2,592,548 |

The net result, after providing for working expenses and interest on the capital invested, is a deficit of £32,456, to which the increased salaries and wages payable under Wages Board awards were a contributing factor. During the year tramway extensions totalling 12 miles 14 chains were opened, making the line mileage 207¾, while a number of new lines are under construction and further extensions are contemplated. Good progress has been made with the erection of the new tramway power house at White Bay, Balmain, and portion of the plant has been erected on permanent foundations and is now under steam. The total staff employed in connection with railways and tramways on June 30 numbered 41,322, as compared with 37,605 in the previous year, an increase of 3,717.

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**Sao Paulo Tramway, Light and Power.**—The usual quarterly dividend of 2½ per cent. has been declared, payable on November 1.

**Greenock Tramways and Municipalisation.**—Mr. H. Ritchie, accountant, Greenock, has prepared a report for the Tramways Committee of Greenock Corporation in connection with a proposal to municipalise the undertaking. He states that if the undertaking should be acquired at the present capital of £252,500, and if the sum were repaid in 30 years with 3½ per cent. interest, an annual payment of £12,641 7s. 4d. would be required. The average amount for traffic receipts during the past 11½ years was £31,330, but Mr. Ritchie thinks that the increase in the last two years has been largely due to the prosperous condition of trade, and in taking this question into consideration the average sum was the only safe and fair amount to be reckoned on. The Corporation are entitled in their option to terminate the lease of the company at periods of 14 or 21 years—namely, at May 15, 1914, and May 15, 1921; and in this event a valuation will be made of the fair market value. On the expiry of the lease in 1928 the Corporation will have the right to purchase on a valuation upon a basis of the then value as defined by Section 43 of the Tramways Act, 1870, which is to be exclusive of any allowance for past or future profits, or any compensation for compulsory sale or other consideration whatever.

**Dick, Kerr and Co.**—Presiding on October 9 at the ordinary general meeting of Dick, Kerr and Co., Ltd., Mr. Claud T. Cayley said he was glad to meet the shareholders with a better showing of results than was the case last year. Although they had been obliged to face a considerable diminution in profits in recent times, the directors had consistently adhered to what they believed to be a sound and conservative policy in regard to depreciation at the works. The stocks in hand and work in progress, which referred only to the manufacturing side of the business, showed an increase of £31,000. This was the high-water mark on this account in the history of the company, and although it locked up more of their capital from a financial point of view, it might be regarded as a favourable sign in other respects. Debtors' bills receivable and outstanding balances on contracts had increased by £71,753, and sundry investments were £28,000 less. The latter item was accounted for by the sale of certain securities and by the writing down of the book value of the investments by the amount of the special reserve of £10,000. This reduction was to a large extent set off by the increased cash balances. There was a net increase of assets over liabilities on those accounts of nearly £60,000; and then they had to take into consideration the increase in the value of the stocks and work in progress, viz., £31,000. The banker's loan was accounted for by the increase in the amount of capital they had been called upon to provide in the shape of increased stocks and increased debtors. The demand for extra working capital was the result of expansion in their manufacturing branches. The board considered that the business, as a whole, was most satisfactory, and they were extremely pleased to be able to meet them with a better result than that which they put before them last year. They were extremely busy in the works; in fact, they had never had more work than they had at the present time. The report was adopted.

*(Continued from page 282)*

## POSITIONS VACANT.

### COUNTY BOROUGH OF STOKE-ON-TRENT.

ELECTRICAL ENGINEER'S DEPARTMENT.

SWITCHBOARD ATTENDANT.

Applications are invited from competent candidates for the position of Switchboard Attendant in one of the electricity works of this County Borough.

Forms of application and list of duties can be obtained on application to the Borough Electrical Engineer, St. Peter's Chambers, Glebe Street, Stoke-on-Trent.

Wages will commence at the rate of 27s. 6d. per week.

E. B. SHARPLEY,
Town Clerk.

October 4, 1913.

### BLACKBURN CORPORATION.

ELECTRICITY DEPARTMENT

SWITCHBOARD ATTENDANT.

Wanted for E.H.T. three-phase and D.C. three wire switchboards. Commencing wage, 30s. per week. Apply not later than Friday, October 17, stating age, previous experience, and enclosing copies of testimonials to the Borough Electrical Engineer, Jubilee Street, Blackburn.

### BOROUGH OF WEDNESBURY.

SHIFT ENGINEER.

Applications are invited for position of Shift Engineer from those having experience in a gas-engine station, with engines of 200 h.p. or over. Reply, stating age, experience, and commencing salary required, to

W. FENNELL, M.I.E.E.,
Borough Electrical Engineer,
Wednesbury.

### ENGINEER.

Wanted, an Engineer to act as Assistant Manager to a Tramways operating about 40 Cars; thorough knowledge of Car-shed and Central Station work essential and some knowledge of outside work desirable. Salary to commence £200 per annum.

Extensions and re-construction in prospect—an interesting position for an active man. Applications will be treated as confidential. Address Box 473, Office of this Journal.

## COPPER AND ALUMINIUM MARKET.

October 10, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, October 10. | Last week. | A Year Ago |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 72 0 0 .. | 74 5 0 .. | 77 2 6 |
| ,, ,, (three months) .. .. | 72 0 0 .. | 74 2 0 .. | 78 0 0 |
| Electrolytic Copper—bars or ingots .. | 77 10 0 .. | 78 0 0 .. | 81 19 0 |
| Aluminium—bars or ingots .. .. .. | 84 0 0 .. | 88 0 0 .. | 82 10 0 |

## COAL MARKET.

October 10, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, October 10. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 24 6 .. | 25 0 .. | 22 6 .. | 21 9 |
| Best Seconds .. .. | 23 6 .. | 23 6 .. | 22 0 .. | 21 0 |
| Ordinary Drys .. .. | 21 0 .. | 21 0 .. | 20 3 .. | 20 1½ |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 6 .. | 19 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 0 .. | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 0 .. | 20 6 .. | 17 0 .. | 16 9 |
| Best Seconds .. .. | 19 0 .. | 19 0 .. | 16 6 .. | 16 0 |
| Ordinary Drys .. .. | 16 6 .. | 16 6 .. | 14 9 .. | 15 1½ |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 14 6 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 3 .. | 15 0 .. | 13 0 .. | 11 3 |
| Best Seconds .. .. | 13 6 .. | 13 6 .. | 12 6 .. | 9 7½ |
| Smalls .. .. .. | 8 0 .. | 8 3 .. | 10 0 .. | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | 1913. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Oct. 7 | £55,231 | £56,823 | 40 | £2,212,543 | +£180 519 |
| Auckland..... (14 days) | Aug. 29 | 18,602 | 19,548 | 9 | 41,610 | + 1,150 |
| Ballarat and Bendigo | Aug. 24 | 838 | 770 | 21 | 18,300 | — 344 |
| Brazilian St. Rly. Mlrs | August | 40,419 | 50,402 | 4 | 50,402 | + 9,983 |
| Brazilian Traction..... | Oct. 4 | 83,156 | 94,441 | 40 | 3,583,601 | + 501,561 |
| Brisbane ..... | Sept. | 24,700 | 25,590 | 39 | 232,768 | + 51,674 |
| British Columbia .....§ | August | 675,272 | 770,628 | 8 | 1,526,571 | + 201,054 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Bueno- Aires Lacrosse.. | Sept. | 43,363 | 44,261 | 39 | 133,945 | + 6,907 |
| Calcutta.....Rs. | Oct. 4 | 67,896 | 73,068 | 40 | 25,90,260 | + 1,15,731 |
| Cape Town ..... | Sept. | ... | 11,290 | ... | ... | ... |
| Carthagena & Herrerias | Sept. | 2,982 | 1,344 | 39 | 24,661 | + 5,365 |
| East India ..... | August | 1,922 | 2,005 | 4 | 2,005 | + 83 |
| Kalgoorlie ..... | August | 3,887 | 3,357 | 34 | 23,379 | — 2,154 |
| La Plata..... | Sept. | 4,103 | 4,528 | 39 | 45,211 | + 9,415 |
| Lima..... | August | 31,828 | 33,900 | 34 | 266,597 | + 12,333 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Sept 30 | 23,810 | 24,851 | 39 | 484,183 | + 35,047 |
| Melbourne ..... | Sept. | ... | 62,000 | ... | ... | ... |
| Mexico ..... § | August | 578,658 | 635,445 | 34 | 4,511,587 | + 90,589 |
| Montevideo..... | Sept. | 27 711 | 27,870 | 47 | 344,301 | + 26,484 |
| Para ..... | Oct. 5 | 4,045 | 3,815 | 44 | 173.4 0 | + 788 |
| Perth (W.A.) ..... | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth..... | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai ..... § | Oct. 1 | 22,239 | 25,260 | 39 | 858,852 | + 95.442 |
| Singapore ..... § | Oct. 4 | 10.198 | 12,241 | 40 | 476,121 | + 60,968 |
| Toronto ..... § | August | 727,925 | 850,222 | 34 | 6,347,674 | + 864 574 |
| Winnipeg..... § | August | 303,761 | 340,507 | 34 | 2,649,702 | + 2:1,872 |


# DICK, KERR & CO.,
**Limited,**

**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**


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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Oct. 1 | £1,480 | £1,601 | + £125 | 18 | £31,064 | + £1,938 |
| Ayr Corporation ..... | ,, 1 | 271 | 367 | + 96 | 20 | 10,245 | + 1,349 |
| Bath Electric ..... | ,, 1 | 899 | 1,061 | + 162 | 40 | 39,673 | + 3,012 |
| Birkenhead Corp. ..... | ,, 5 | 1,165 | 1,279 | + 114 | 27 | 35,294 | + 3,596 |
| Birmingham Corp. ..... | ,, 4 | 11,120 | 12,775 | + 1,655 | 27 | 311,960 | + 25,011 |
| Blackburn Corporation | ,, 1 | 1,191 | 1,390 | + 209 | 27 | 34,468 | + 3,505 |
| Blackpool & Fleetwood | ,, 4 | 743 | 1,030 | + 287 | 14 | 25,777 | + 4,204 |
| Blackpool Corporation | ,, 2 | 1,775 | 2,527 | + 752 | 26 | 67,719 | + 10,579 |
| Bolton Corporation ..... | ,, 5 | 2,581 | 2,791 | + 210 | 27 | 74,650 | + 4,329 |
| Bournemouth Corp..... | ,, 8 | 1,767 | 2,009 | + 242 | 27 | 64,290 | + 7,482 |
| Bradford Corporation.... | ,, 4 | 5,497 | 6,136 | + 639 | 27 | 162,379 | + 10,200 |
| Brighton Corporation... | ,, 5 | 995 | 1,134 | + 139 | 27 | 34,078 | + 2,223 |
| Bristol ..... | ,, 3 | 7,674 | 8,604 | + 930 | 39 | 321,894 | + 44,296 |
| British Elec. Federatn | ,, 3 | 39,530 | 56,536 | * | ... | ... | ... |
| Burnley Corporation ... | ,, 4 | 1,680 | 1,781 | + 121 | 27 | 46,747 | + 5,751 |
| Burton-on-Trent Corp. | ,, 5 | 294 | 296 | + 2 | 27 | 7,965 | + 339 |
| Bury Corporation..... | ,, 5 | 1,287 | 1,316 | + 29 | 27 | 35,826 | + 1,430 |
| Cardiff Corporation..... | Sept. 13 | 2,572 | 2,959 | + 387 | 24 | 66,900 | + 7,534 |
| Chatham and District.. | Oct. 2 | 959 | 1,078 | + 119 | 39 | 36,669 | + 2,234 |
| Chesterfield Corp. ..... | ,, 3 | 228 | 269 | + 41 | 26 | 6,933 | + 884 |
| Colne & Trawden..... | ,, 4 | 243 | 284 | + 36 | 40 | 11,096 | + 752 |
| Cork Electric..... | ,, 2 | 480 | 557 | + 77 | 39 | 19,446 | + 428 |
| Croydon Corporation ... | Sept. 26 | 1,833 | 1,793 | — 40 | 25 | 43,335 | — 4,807 |
| Darlington Corporation | Oct. 4 | 226 | 255 | + 29 | 27 | 6 733 | + 692 |
| Derby Corporation ..... | ,, 4 | 875 | 1,042 | + 167 | 27 | 27,062 | + 2,946 |
| Dover Corporation .... | ,, 4 | 246 | 285 | + 39 | 27 | 7,357 | + 125 |
| Dublin & Lucan ..... | ,, 3 | 158 | 141 | — 17 | 18½ | 2,930 | + 48 |
| Dublin United ..... | ,, 3 | 5 689 | 3,794 | — 1,895 | 39 | 224,182 | — 7,971 |
| Dundee City ..... | ,, 1 | 1,260 | 1,380 | + 120 | 20 | 28,757 | + 2,013 |
| East Ham Corporation | ,, 4 | 1,037 | 982 | — 55 | 27 | 27,543 | — 1,216 |
| Exeter Corporation .... | ,, 4 | 324 | 377 | + 53 | 27 | 9,764 | + 457 |
| Gearless Mo'or 'Buses. | ,, 4 | ... | 647 | ... | 26 | 12,733 | ... |
| Glasgow Corporation ... | ,, 4 | 19,063 | 21,881 | + 2,818 | 13 | 361,050 | + 26,263 |
| Glossop(U.Elec.Supply) | ,, 4 | 123 | 139 | + 16 | 40 | 5,214 | + 576 |
| Halifax Corporation ... | Sept. 30 | 1,937 | 2,289 | + 252 | 26 | 57,585 | + 1,468 |
| Hastings & District..... | Oct. 2 | 983 | 1,216 | + 233 | 40 | 43,193 | + 3,206 |
| Huddersfield Corp. ..... | ,, 4 | 1,991 | 2,219 | + 228 | 27 | 58,418 | + 3,746 |
| Hull Corporation ..... | ,, 4 | 2,990 | 3,211 | + 221 | 27 | 82,656 | + 4,142 |
| Ilford U.D.O. ..... | ,, 4 | 418 | 458 | + 40 | 27 | 12,340 | — 1,464 |
| Ilkeston Corporation ... | ,, 8 | 116 | 137 | + 21 | 28 | 3,746 | + 637 |
| Ipswich Corporation ... | ,, 4 | 418 | 505 | + 57 | 27 | 13,400 | + 499 |
| Isle of Thanet ..... | ,, 4 | 372 | 376 | + 4 | 4 dys. | 376 | + 4 |
| Kilmarnock Corp. ..... | ,, 4 | 165 | 180 | + 15 | 20 | 3,712 | + 267 |
| Lanarkshire ..... | ,, 2 | 1,649 | 2,117 | + 468 | 39 | 66,241 | + 8,054 |
| Lancashire United ..... | ,, 1 | 1,425 | 1,791 | + 366 | 39 | 60,727 | + 6,961 |
| Leeds City ..... | ,, 4 | 7,967 | 8,778 | + 811 | 27 | 225,928 | + 15,318 |
| Leicester Corporation.. | ,, 4 | 2,575 | 2,953 | + 331 | 40 | 111,778 | + 10,587 |
| Leith Corporation ..... | ,, 4 | 651 | 755 | + 104 | 20 | 15,131 | + 612 |
| Liverpool Corporation.. | ,, 4 | 12,262 | 13,457 | + 1,195 | 39½ | 513,217 | + 38,996 |
| Llandudno &Colwyn B. | ,, 3 | 267 | 292 | + 25 | 44 | 16,217 | + 1 394 |
| London County Council | ,, 1 | 42,058 | 43,851 | + 1,793 | 28 | 1,106,125 | — 12,320 |
| London Gnl. Omnibus.. | ,, 4 | 56,789 | 67,013 | +10,224 | 40 | 2,49 ),246 | + 478 25 ) |
| London United ..... | ,, 3 | 6.038 | 7,035 | + 947 | 40 | 254,101 | + 3,499 |
| Lowestoft Corporation | ,, 4 | 193 | 219 | + 26 | 4 dys. | 125 | + 17 |
| Maidstone Corporation | ,, 2 | 230 | 277 | + 33 | 27 | 5,762 | + 313 |
| Manchester Corp..... .. | ,, 4 | 17.101 | 18,428 | + 1,327 | 27 | 477,045 | + 24,677 |
| Met. Elec. Trys. ..... | ,, 3 | 8,778 | 10,002 | + 1,224 | 40 | 361,932 | + 11,060 |
| Nelson Corporation..... | ,, 4 | 175 | 204 | + 29 | 27 | 5,853 | + 383 |
| N'castle-on-Tyne Corp. | ,, 4 | 4,476 | 5,077 | + 601 | 27 | 139,374 | + 11,840 |
| Newport (Mon.) Corp.... | ,, 4 | 713 | 798 | + 85 | 27 | 20,832 | + 1,620 |
| New St. Helens & Dist... | ,, 1 | 733 | 855 | + 122 | 14 | 12,434 | + 1,438 |
| Northampton Corp ..... | ,, 3 | 523 | 636 | + 113 | 27 | 16,046 | + 1,103 |
| Nottingham Corp. ... .. | ,, 2 | 3,394 | 3,839 | + 445 | 23½ | 89,178 | + 3,874 |
| Oldham Corporation ... | ,, 5 | 2,053 | 2,246 | + 190 | 28 | 62,101 | + 4,040 |
| Portsmouth Corp..... | ,, 4 | 2,063 | 2 403 | + 340 | 27 | 65,493 | + 3,779 |
| Preston Corporation ... | ,, 1 | 795 | 923 | + 131 | 27 | 24,232 | + 1,437 |
| Provincial ... .. ..... | ,, 4 | 1,791 | 2,052 | + 263 | 4 dys. | 1,164 | + 189 |
| Reading Corporation .. | ,, 2 | 714 | 730 | + 16 | 26½ | 18 782 | + 1,232 |
| Rochdale Corporation ... | ,, 4 | 1,535 | 1,691 | + 56 | 27 | 44,226 | + 1,749 |
| Rotherham Corp..... | ,, 8 | 891 | 997 | + 106 | 27 | 27,242 | + 6,964 |
| Salford Corporation ... | ,, 6 | 4,949 | 5,209 | + 260 | 27 | 142 738 | + 5,549 |
| Sheffield Corporation... | ,, 5 | 6,931 | 7,278 | + 347 | 28 | 202.915 | + 13,001 |
| Southampton Corp. ... | ,, 1 | 1,311 | 1,502 | + 191 | 26 | 36,525 | + 1,922 |
| Southend-on-Sea Corp | ,, 1 | 756 | 1,062 | + 306 | 27 | 29.182 | + 4.744 |
| South Met. Trys. .... . | ,, 3 | 835 | 1,245 | + 410 | 40 | 36.400 | + 2,318 |
| South Shields Corp..... | ,, 4 | 648 | 727 | + 79 | 27 | 20,018 | + 2,622 |
| Sunderland Corp. ..... | ,, 5 | 1,365 | 1,431 | + 81 | 27 | 40,250 | + 4 473 |
| Sunderland District ... | ,, 1 | 495 | 596 | + 101 | 48 | 24,459 | + 4,691 |
| Swindon Corporation ... | ,, 1 | 160 | 184 | + 24 | 26 | 4,513 | + 324 |
| Trys. (M.E.T.) 'Buses | ,, 4 | ... | 9,610 | ... | 36 | 171,753 | .. |
| TynesideTrys.&Tmrds | ,, 1 | 448 | 511 | + 63 | 14 | 7,453 | + 542 |
| Wallasey Corporation | ,, 4 | 1,035 | 1,233 | + 198 | 27 | 34,633 | + 3,239 |
| Walsall Corporation ... | ,, 4 | 592 | 673 | + 81 | 40 | 24,834 | + 1,759 |
| Walthamstow U.D.C.... | ,, 4 | 647 | 787 | + 140 | 27 | 20,773 | + 118 |
| Warrington Corp ..... | Sept. 24 | 423 | 454 | + 31 | 26 | 11,407 | + 361 |
| West Ham Corporation | Oct. 2 | 2,628 | 2,817 | + 209 | 26 | 72,927 | + 2,177 |
| Wigan Corporation ... | ,, 2 | 1,384 | 1 522 | + 138 | 26½ | 39,359 | + 4,100 |
| Wolverhampton Corp | ,, 8 | 1,012 | 1,090 | + 78 | 28 | 30,173 | + 1,757 |
| Yorkshire (W. Riding | ,, 5 | 1,341 | 1,423 | + 82 | 40 | 53,110 | + 6,275 |

* From such of the services as were working both last year and this year the receipts show an increase of £4,766 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Oct. 4 | £5,345 | £4,456 | — £889 | 40 | £191,755 | + 28,153 |
| City and South London | ,, 4 | 2.965 | 2,544 | — 421 | 40 | 111.055 | — 10,558 |
| Liverpool Overhead..... | ,, 5 | 1,559 | 1,712 | + 153 | 40 | 68,790 | + 5,343 |
| London Electric..... | ,, 4 | 14,020 | 12.810 | — 1,210 | 40 | 549.250 | + 2.570 |
| Mersey ..... | ,, 4 | 2 326 | 2,328 | + 2 | 40 | 89.310 | + 5,020 |
| Metropolitan ..... | ,, 5 | 16,827 | 17.634 | + 807 | 40 | 683,061 | + 18,623 |
| Metropolitan District.. | ,, 4 | 13,370 | 12,820 | — 550 | 40 | 515,679 | + 17,907 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, October 10. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | ... | 74 — 77 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅛ — 4⅜ |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅛ — 4⅜ |
| 100 | Do. 4% Deb. Stk. Red..... | ... | 92 — 94 |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 96½ — 98½ |
| 100 | Do. 5% Deb. Stk. Red..... | ... | 98½ — 100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 — 102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅝ — ¾ |
| 1 | Do. 5% Cum. Pref ..... | ... | 31/32 — 1 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red..... | ... | 70 — 75 xd |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 6 | 88½ — 90½ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | ... | 7½ — 7⅝ |
| 5 | Do. do. 5% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 99 — 102 |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6¼ |
| 10 | Do. do. 4% Cum. Pref. ..... | + ¼ | 7 — 7⅛ |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 — 102 |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 |
| 100 | British Columbia Elec. Ry. Co., Lim., Def. Ord. Stk. | — 3 | 121 — 124 |
| 100 | Do. Pref. Ord. Stock ..... | — 1 | 109 — 113 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | — 1 | 99 — 102 |
| 100 | Do. 4½% 1st Mort. Debs. ..... | ... | 100 — 103 |
| 40 | Do. 4½% Vancouver Power Debs..... | + 2 | 100 — 104 |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. ..... | — 1 | 89 — 92 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 86 — 89 |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 50 — 53 |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | + ½ | 12½ — 14½ |
| 100 | Do. Deferred Ord. Stock ..... | ... | 4 — 6 |
| 100 | Do. 5% Perpetual Debenture Stock..... | ... | 92 — 95 xd |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 76 — 79 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ... | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | ... | 6 — 6½ |
| 5 | Do do. 5% Cum. Pref. ..... | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ⅛ — ⅛ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 100 | Do. 5% Debs. Red. ..... | ... | 87½ — 90½ |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | ... | 5¼ — 5½ |
| 100 | Do. 4% Debenture Stock Red. 1935 ..... | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.... | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | — 2 | 93½ — 95½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | ... | — 10½ |
| 10 | Do. do. 6% Pref. ..... | ... | — 11¾ |
| 100 | Do. do. "A" Red. ..... | ... | — 82 xd |
| 100 | Do. do. Deb. Stock "B" Red. ... | ... | — 79¼ |
| 10 | Gateshead & Dist Trys. Co., Ord. ..... | + ¼ | 8¾ — 9¼ xd |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. ..... | ... | ⅝ — ¾ |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | ¼ — ¾ xd |
| 100 | Do. do 4½% Deb. Stk. Red. .... | ... | 66 — 71 ,, |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ... ..... | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. ..... | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum Pref. ..... | — ¼ | 6¼ — 6¾ |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 78 — 79 |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2⅛ — 2⅜ |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | ⅞ — 15/16 |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. ..... | — 7 | 18 — 88 |
| 7/8 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | ¾ — 1 xd |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 1 — 1⅛ |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1⅛ — 1⅜ |
| 100 | Do. 5% Mort. Debs. ..... | .. | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ⅛ — ⅜ |
| 100 | London General Omnibus Company, Limited 4½% Deb. | ... | 96 — 98 |
| 100 | Do. Do 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 60 — 64 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref ..... | ... | 4⅝ — 5 xd |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ... ..... | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 109 —112 xd |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 1⅜ — 1⅝ |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ... | ... | 88 — 86 |
| 100 | Do. 5% Deb. Stock, Red ... | — 1 | 86 — 89 xd |
| $100 | Mexico Tramways Co., Common Stock ..... ..... | — 5½ | 85 — 88 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 1½ | 89½ — 91½ |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — 2½ | 91 — 93 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1932) .... | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) ... | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd ..... | ... | 1⅛ — 1⅜ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6¼ — 6½ |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | — ⅛ | 5⅞ — 6⅜ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams.. Ltd., Ord..... | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | ... | 3/32 — 5/32 |
| 1 | Do. 5% Cum Pref. ..... | ... | ⅛ — ⅛ |
| 100 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim.. Ord. ..... | ... | 31/32 — 1 |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% ... | ... | 84 — 87 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5⅛ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 95 — 97 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 83 — 85 xd |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | — 3 | 93¼ —101½ |
| 100 | 5% 50-yr. Mort Gold Bonds ..... | — 5 | 88½ — 90½ |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | — 2 | 98 —101 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ... ..... | — 3 | 99 —102 |
| 10 | Shanghai Elec. Construction Co. ..... | ... | 9¼ — 10¼ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 86 — 90 xd |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | ⅝ — ¾ |
| 100 | Do. do. 4% Deb. Stk..... | ... | 68 — 72 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. ..... | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ... ... | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 87 — 89 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 83½ — 92¾ |
| 5 | United Elec. Tramways of Monte Video, Ord..... | ... | 4⅝ — 5 |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4⅛ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 99½ —100½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ⅜ — ½ |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 3⅜ — 3⅝ |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 81 — 85 |

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# TRACKLESS TROLLEY INSTALLATION AT KEIGHLEY.

BY HARRY WEBBER, A.M.I.E.E.
*(Electrical Engineer and General Manager, Keighley Corporation Tramways).*

Probably one of the most interesting questions which is occupying the attention of tramway managers and electrical engineers generally is how to deal with the traffic in districts where only a very limited revenue may be expected, and at the same time how to make the enterprise a financial success. The latest, and what appears to be the most satisfactory, method of dealing with this problem, is the adoption of electrically-propelled vehicles running on the road surface without rails but collecting the electrical energy from overhead conductors in various ways.

In this article I propose to deal principally with the system installed at Keighley, and I think it would be useful to anyone interested in this subject to know the chief reasons why the "Cedes-Stoll" system of trackless trolley vehicles was adopted. I will also add a few remarks to show what the results have been after about four months' practical trial in regular service for passenger traffic.

Cedes-Stoll Car Turning at Ingrow Terminus.

Cedes-Stoll Car in Service at Keighley.

Petrol-driven motor omnibuses had already been tried in Keighley on the same routes on which it is now proposed to adopt trackless trolley vehicles, but unfortunately, after four years' experience, it was generally accepted that the petrol-driven omnibus was not a financial success in Keighley, owing to the fact that the costs averaged 1s. 3d. per omnibus mile, whilst the receipts did not exceed an average of 11½d. per mile. It was largely owing to the experience gained in connection with the motor omnibuses, that the Visiting Committee of the Keighley Corporation decided to look out for a system which had the smallest possible amount of gearing and other mechanical contrivances. Full powers were obtained from Parliament by the Keighley Corporation Act, 1912, to equip a number of routes with overhead wiring for the purpose of running trolley vehicles. In order that the position in Keighley may be made perfectly clear a few leading features of some of the restrictions imposed upon the Corporation by Parliament may be given.

1. Vehicles when fully loaded with passengers must not exceed a weight of 5 tons each. This in my opinion is one of the most important restrictions imposed, and was partly responsible in guiding the Council to the decision to adopt the Cedes-Stoll system, owing to the light weight of its mechanism.

2. The carriage way for county and district roads should not be less than 15 ft. wide (with certain provisions).

3. No post or other apparatus must be erected on the carriage way except with the consent of the Board of Trade and the road authority.

4. No trailers must be used in connection with the trolley vehicles without the consent of the Board of Trade and the consent in writing of the County Council.

Besides these restrictions, the Board of Trade have not yet sanctioned the adoption of double-deck trackless trolley vehicles, although I believe a certain amount of

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pressure is being brought to bear on this point by some authorities where double-deck vehicles are considered essential.

Before embarking on the whole of the work sanctioned by Parliament, it was decided in Keighley to equip about 1¾ miles as a trial length. The three systems considered were :

The "R.E.T." system already installed in Leeds, Bradford, and elsewhere.

The "Bremen" system as put forward by the Brush Company, although no actual installation was then working in this country.

The "Cedes-Stoll" system, a small length of which was available at West Ham for inspection purposes.

The third was the system which appealed to the Visiting Committee as being the greatest improvement on petrol-driven motor omnibuses. The other types require differential gears and some form of mechanical driving between the motor and the axles. After a full inspection of all the existing routes, it was decided to accept the Cedes-Stoll tender for 1¾ miles of equipment on the following conditions, viz. :

1. That the Cedes Electric Traction Company, Limited, lent a vehicle for three months free of charge.

2. If after the end of three months' running the system was deemed to be unsatisfactory, the company would be required to convert the overhead equipment to suit any other form of current collection required.

On the other hand, if everything was perfectly satisfactory, the Keighley Corporation agreed to place an order for two trackless trolley vehicles with the company besides the 1¾ miles of overhead equipment. I may say that the company were so confident of achieving good results that they accepted these very onerous terms. The sub-contractors for the overhead equipment were Messrs. Clough, Smith, and Company, Limited, of Spencer House, South Place, London, E.C.

It may be as well to remark here that my subsequent experience of the running of this trial route shows that a great deal depends on the proper erection of the overhead wires in connection with any system of over-running collection, and I think the fact that the current collector has never given us any trouble during the four months' operation points to the excellent manner in which Messrs. Clough, Smith, and Company carried out their part of the work.

During the tour of inspection the Visiting Committee heard a good number of "fairy tales," principally directed against the motor of the Cedes-Stoll vehicle, and the following are a number of points I raised upon the system generally, and included in my report to the Corporation upon the subject.

1. Should the vehicle be stopped in the middle of a fairly steep hill, will it be able to gather speed again quickly without causing the motors to take an excessive amount of current, producing liability to overheat, and breaking down the insulation ?

2. I presume the motors are run in series on ordinary flat ground, but when starting off from a stop in the middle of a hill it would be necessary to put them in parallel, which means that the insulation would then get the full 500 volts instead of the half voltage which they have on normal flat ground.

3. Will you guarantee your motor to run satisfactorily for fairly long distances with the motors in parallel, and the insulation subjected to 500 volts ?

Assuming the cars to meet in a very dark spot on the road after dusk in the winter time, what provision do you make so that the drivers are not left in pitch darkness when the connection is taken out ?

4. Assuming the driver accidentally let go the collector on a hill, would it not run away down the wires before he could recover it ?

5. What is the total weight of the current-collecting device, with automatic cable extension and balance weight ?

6. It has come to my knowledge that in one town on the Continent, the engineer in charge of the system says that the hub motor is the bane of his life, principally due to getting water on to the brush gear.

Assuming a driver has to look to his brushes on a stormy night, I cannot conceive how he could prevent rain driving in during the operation. Perhaps you might state what is the procedure in such a case on some of your existing routes.

7. Is it not a fact that if the tyres are worn down, and the road has fairly large stones on it, it is more than probable that the brake block will foul and become damaged ?

8. Is it not a fact that a lot of trouble is experienced with the current collector getting off the wires ?

9. What is the efficiency of your hub motor ?

10. How many different speeds is it possible to run your 'bus on a hill with about 1 in 15 gradient ?

11. Would you be prepared to sell a 'bus on the understanding that if before the end of 12 months the purchasers could prove that the difficulties under working conditions were far greater than any other system, then you would take the 'bus back, or else overcome the difficulties in a satisfactory manner ?

12. In designing the motor, what current density is allowed per square inch of copper when working on full load ?

To all these queries the company replied satisfactorily, and the behaviour of the motors on the vehicle lent to us has subsequently corroborated the replies sent.

The following is another extract from my report which will show that I was very much inclined to doubt the capabilities of a hub motor of this description at the outset.

There are two particular features of this system. One is that the motors are contained in the hubs of the back wheels ; consequently, no spur wheels or chains are required for driving. The axle itself does not turn round ; simply the rims of the wheels are moved by repulsion of the field magnets, which are bolted rigidly on to a square bar passing underneath the car. The rim of the wheel contains the armature of the motor, and this is carried by two sets of ball bearings, one at each end of a sleeve. On the outer side of the wheel there is a circular cover plate fixed by some small set screws. There is a circular tongue on this cover which fits into a recess, at the bottom of the recess being a rubber ring, and this is claimed to make the motor absolutely water-tight. A demonstration was given showing that the cover plate can be removed in about half-a-minute. Upon its removal the most vital parts of the motor, consisting of the commutator and brush gear, became exposed. Owing to the fact that the rims of the wheels are the only revolving parts in the driving mechanism, it is necessary to arrange the brakes on some portion of these.

This is effected by a brake drum screwed on to the armature. As one portion of this is revolving whilst the cover plate is stationary, it is questionable whether this part of the motor is water-tight. Another point which was apparent is that with the tyre worn down very near to the rim it only leaves a slight clearance between the outside of this brake drum and the road surface itself ; consequently it is possible by passing over a large stone to ride on the brake drum instead of the tyre, in which case this would have to take a large portion of the weight of the vehicle. As the castings are of a frail nature, it is only to be anticipated that some part would break. It was stated that the motors shown were of 22 H.P. capacity, but it appeared to me that this output was extremely large for the space available. The other special feature of this system is that instead of trolley poles carried on the top of the vehicle, as at Bradford and Leeds, there is a small flexible wire which is pulled out and wound up on a drum automatically to suit the particular distance the car is from the overhead wires. The current collector device attached to this flexible wire consists of a small carriage supported on four wheels. The connection with the overhead equipment is easily detached by means of a spring socket, and should the vehicle be accidently driven too far from the overhead wires this pulls out automatically instead of rupturing anything on the tension drums or flexible wires.

The principal advantages claimed for the Cedes-Stoll system of current collection is that it saves a lot of weight on the top of the vehicle and is far more flexible than the under-running trolley pole. Also, it is very easy to effect a passing with a trolley vehicle coming in the opposite direction. The drivers simply disconnect their overhead current collectors at the socket already mentioned and exchange, the consequence being that the collector which was coming down the hill goes back with the vehicle that is coming up the hill, and *vice versa*. Naturally there are several disadvantages to this mode of collecting current, the principal being that as the carriage runs on the top of the wires it is quite impossible to work this particular form of collector on the existing tramway overhead equipment, and in order to get the vehicles home into the car shed it would be necessary to adopt one out of four alternatives, namely :

(1) To tow the vehicles home behind a tramcar. This would occur every night and morning.

(2) To have a small pole fitted on the top of the car together with a brake shoe (which could be lowered on to the rails) as well as the flexible equipment.

(3) To run a special overhead equipment right to the car shed, simply for these vehicles to travel home on.

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(4) To house these new vehicles in some shed within easy reach of the new overhead equipment.

Another point which is a disadvantage to the over-running collector appears to be a possibility of the whole collector leaving the wires, and coming down on the top of some unfortunate pedestrian's head. As this apparatus weighs at least 24 lb., it will be appreciated that such an occurrence may result in fatal consequences.

From the extracts quoted, it will be seen that the Council at Keighley were kept fully acquainted with the possibilities of what might happen, and consequently I think that the action of the Tramways Committee in placing an order for two vehicles with the Cedes Electric Traction Company at the expiration of the three months' trial period speaks for itself that the equipment has given every satisfaction. The travelling public seem greatly to appreciate the new system.

I will now give a few leading particulars of the construction and cost of the overhead equipment. The exact length is 1 mile 1,400 yards, and the contract amount for this was £1,610. Lattice poles were adopted and the overhead conductors suspended on the solid system to bracket arms. No feeder cables were necessary, the positive wire being simply tapped on to one of the existing tramway trolley wires. A positive and a negative grooved wire were arranged for with mechanical ears, it being decided that the vehicles in passing each other should simply change over current collectors. This operation has not yet been tried in Keighley, but providing the sockets are so arranged that it is impossible to reverse the leads from positive to negative when making the exchange, this appears to offer very little difficulty. One particular advantage with a flexible collector instead of an under-running trolley boom is that there is no necessity to have a circle at each end of the line to enable the vehicles to turn round, the two wires simply requiring to be anchored to a good stiff pull-off pole. With the under-running system it is necessary to erect four wires instead of two.

Up to the present time the return wire is effectively attached to the rails, and earth plates are sunk at every half-mile sectioning pole. The guard wiring has been erected to comply with the Post Office requirements, and is earthed to the return wire at about every other span. Since an examination was made, the vehicle lent to the Corporation has accomplished just over 5,000 miles, and the current consumption has been seven-eighths of a Board of Trade unit per mile run.

The route lies on a hillside and is a steady incline from the beginning to the terminus, the gradient in places being 1 in 11.

I have paid particular attention to the wear on the tyres, and estimate this to be only one-quarter of what takes place on our petrol-driven omnibuses. This is a very important saving, as our present contract for tyres on motor omnibuses is 2d. per 'bus-mile, the actual cost last year for the tyres alone being over £700 on an average service of three motor omnibuses.

I may say that the road surface on which the vehicle has accomplished the 5,000 miles is of a very ordinary character, no special preparation having been made, and I have taken particular notice as to what effect the trackless trolley vehicle has had upon the road during the last four months. From my observations I consider that the wear and tear of the road surface with this particular form of traction is negligible. This can be attributed partly to the very light weight of the vehicle when fully loaded, and the fact that the system is extremely flexible, allowing the driver to avoid keeping in one recognised groove. I should estimate that the wear on the road surface, as compared with petrol-driven motor omnibuses, bears about the same ratio as the wear on the tyres—that is to say, the omnibuses would

Current Collector of Cedes-Stoll Car over Motor Omnibus.

Showing Simple Manner in which Wires Terminate.

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destroy the road surface four times as quickly as the Cedes-Stoll trackless trolley cars.

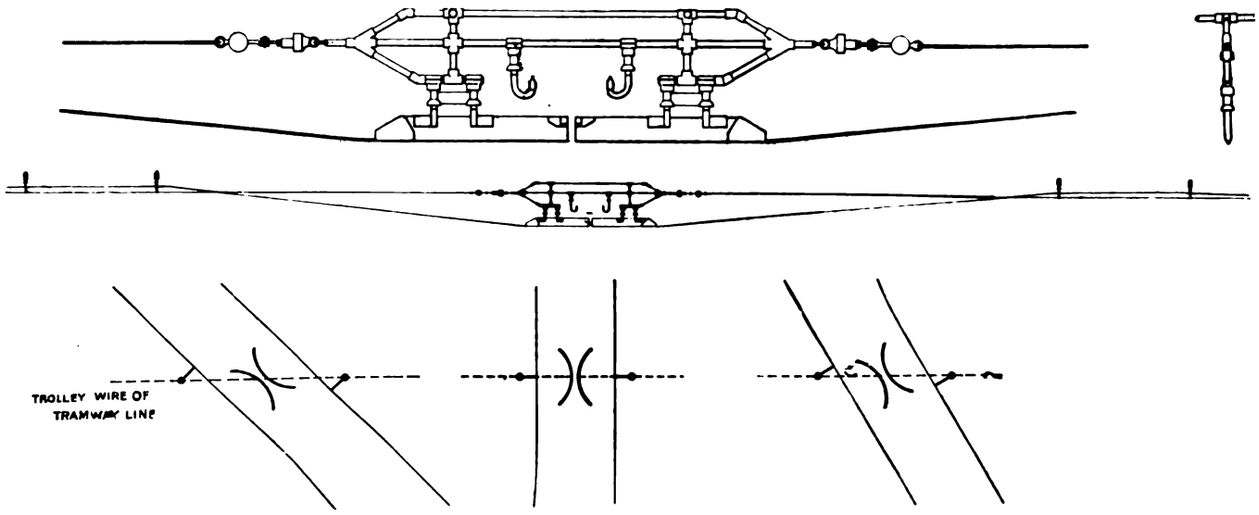
The capital cost of the new vehicles (two of which are at present on order) will be approximately £720 each equipped with tyres, thus making a sum of £1,440 to be added on to the £1,610, and allowing a further £200 for housing accommodation, this makes a total of £3,250 as the capital outlay in connection with the particular route being dealt with. The period for repayment of capital expenditure authorised by Parliament was 10 years in connection with the trolley vehicles, and 20 years in connection with the provision of electrical equipment and the construction of any other works necessary for the working of trolley vehicles. The interest and sinking fund necessary to extinguish the debts in the time mentioned on the capital expenditure of £3,250 would be approximately £300 per annum. Taking the number of miles run on this route last year by the motor omnibuses, namely, 21,573, and by dividing this number of miles into the £300, it gives a figure of 3·338d. per mile run which must be earned in order to cover interest and sinking fund charges above.

Compared with figures which have been published in connection with other trackless trolley equipments this figure is very moderate. The average revenue obtained up to date is almost exactly 12d. per mile, thus leaving 8·662d. per mile for all working expenses and cost of electrical energy. No reliable figures can be quoted at the present moment in connection with working expenses, but with electricity at 1d. per unit, the power comes out at ·9d. for every mile run. From experience gained up to this date I should estimate that the working expenses, including power costs, will not exceed 6½d. per mile.

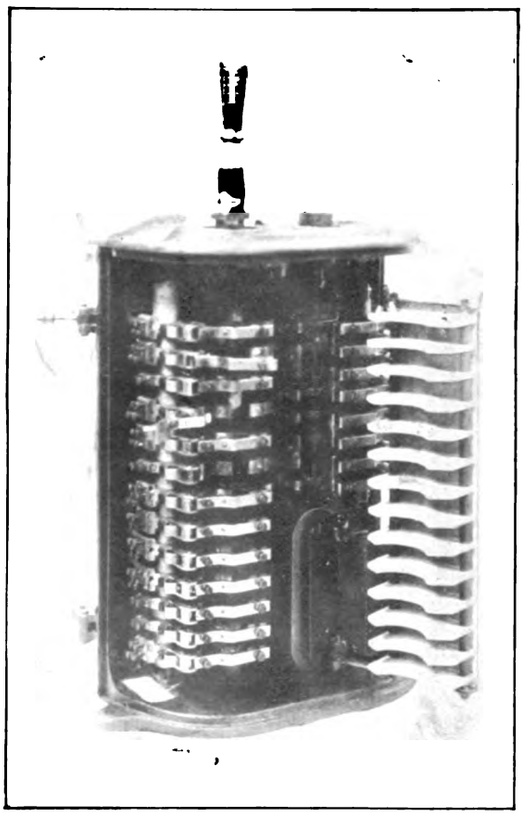
Seeing that the driving movement is obtained through an air gap, which can be aptly termed a magnetic coupling, the vehicle starts off in the smoothest manner possible without any shock or jar, and runs almost as smoothly as an ordinary tramcar on rails.

It should also be borne in mind that I am quoting experience obtained with a vehicle which was designed for Continental roads and conditions. It is expected that the new vehicles on order, which are being constructed to meet British conditions, will give even better results than those at present being obtained.

One part of the equipment deserves special mention, namely, the controller that is shown in one of the illustrations. This is specially designed and constructed for easy renewal of fingers. The fingers are fixed by a spring, and can be removed with very little trouble in a few seconds without any tools, a new finger being replaced in a corresponding manner. Another feature of this controller is that it is arranged so that should one of the motors give trouble, it can be cut out by removing a few fingers and making a connection with a connector fitted to the controller in readiness for this purpose. The idea of this is to enable a driver to get the vehicle home with the other motor which is in a sound condition. A blow-out coil is fitted, and the controller has seven speeds, four with the motors in series, three with the motors in parallel, and an electric brake with four positions. The controller is somewhat similar to the standard tramway type, but is designed to meet the exact requirements of the Cedes-Stoll trolley vehicles.




Crossings of Tramway Trolley Wires by Cedes-Stoll Lines.



Cedes Controller.

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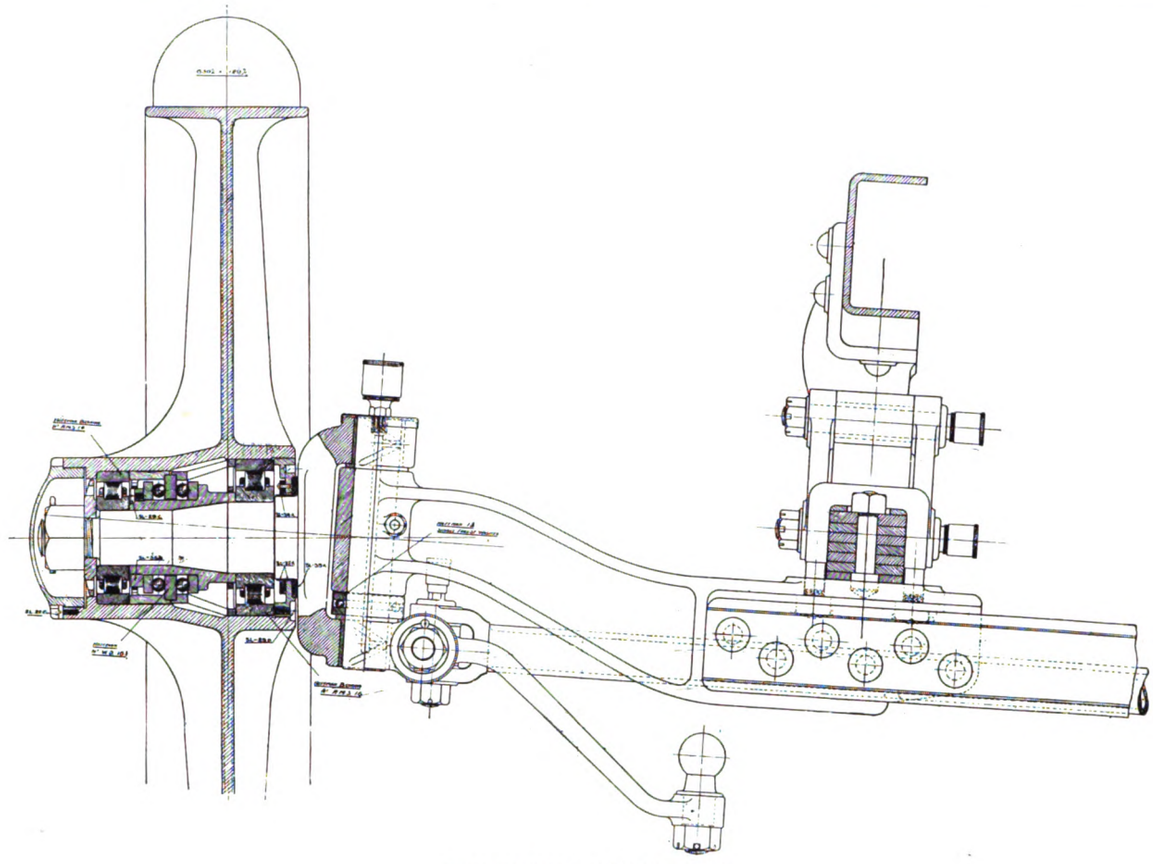
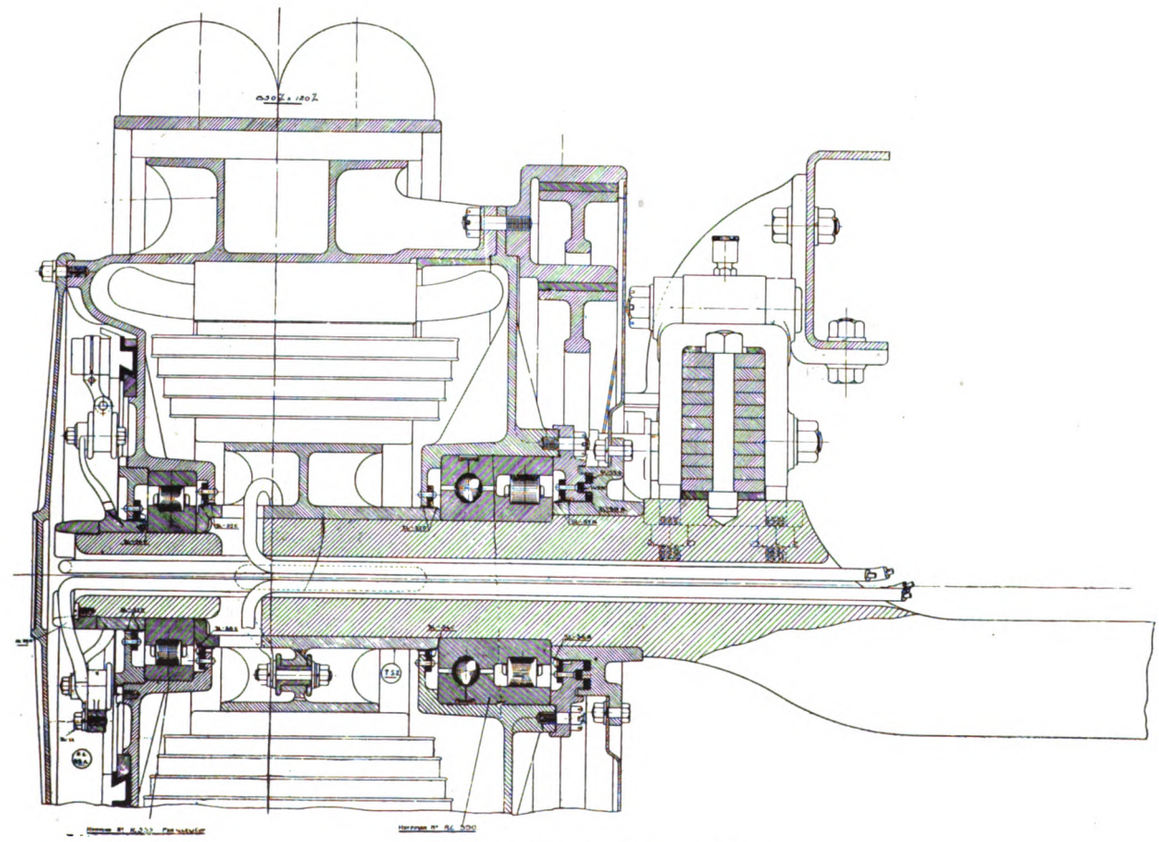


Arrangement of Front Axle.



Arrangement of Rear Axle and Motor.

DETAILS OF AXLES AND MOTOR OF CEDES-STOLL TRACKLESS VEHICLE.

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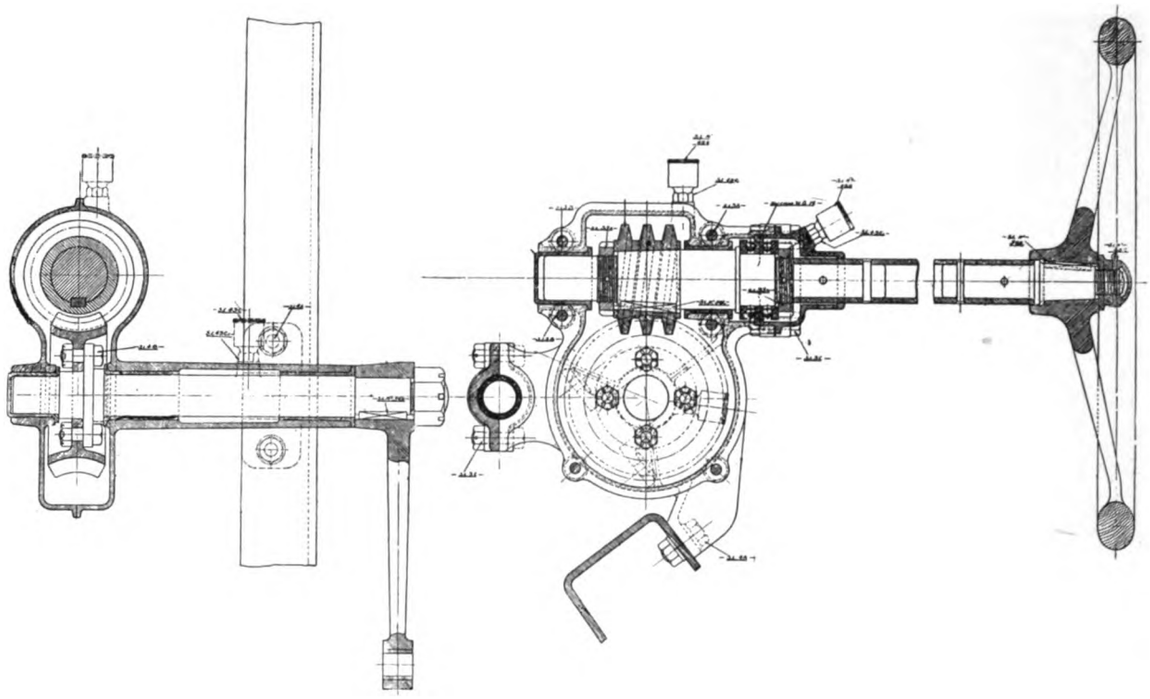
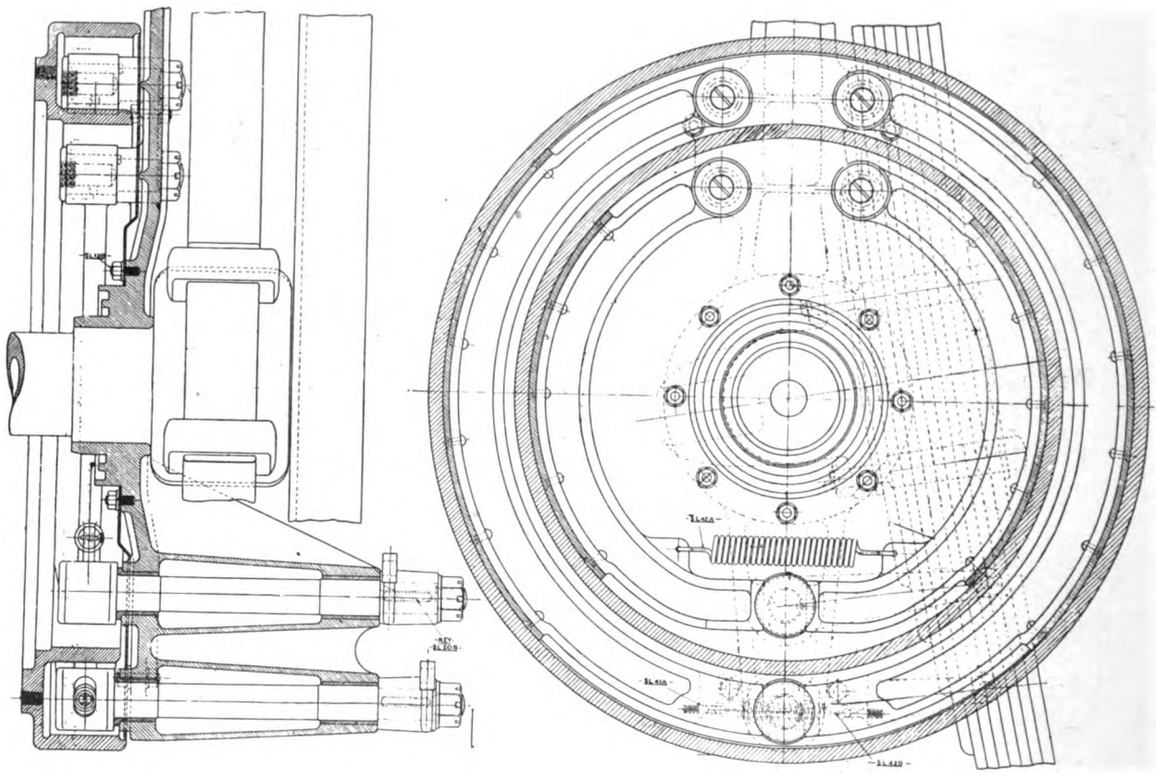


Arrangement of Steering Box.



Arrangement of Rear Wheel Brakes.

DETAILS OF STEERING BOX AND REAR WHEEL BRAKES OF CEDES-STOLL TRACKLESS VEHICLE.

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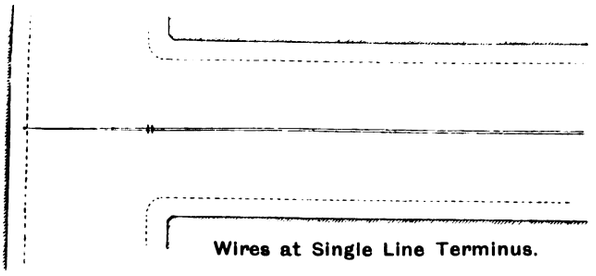
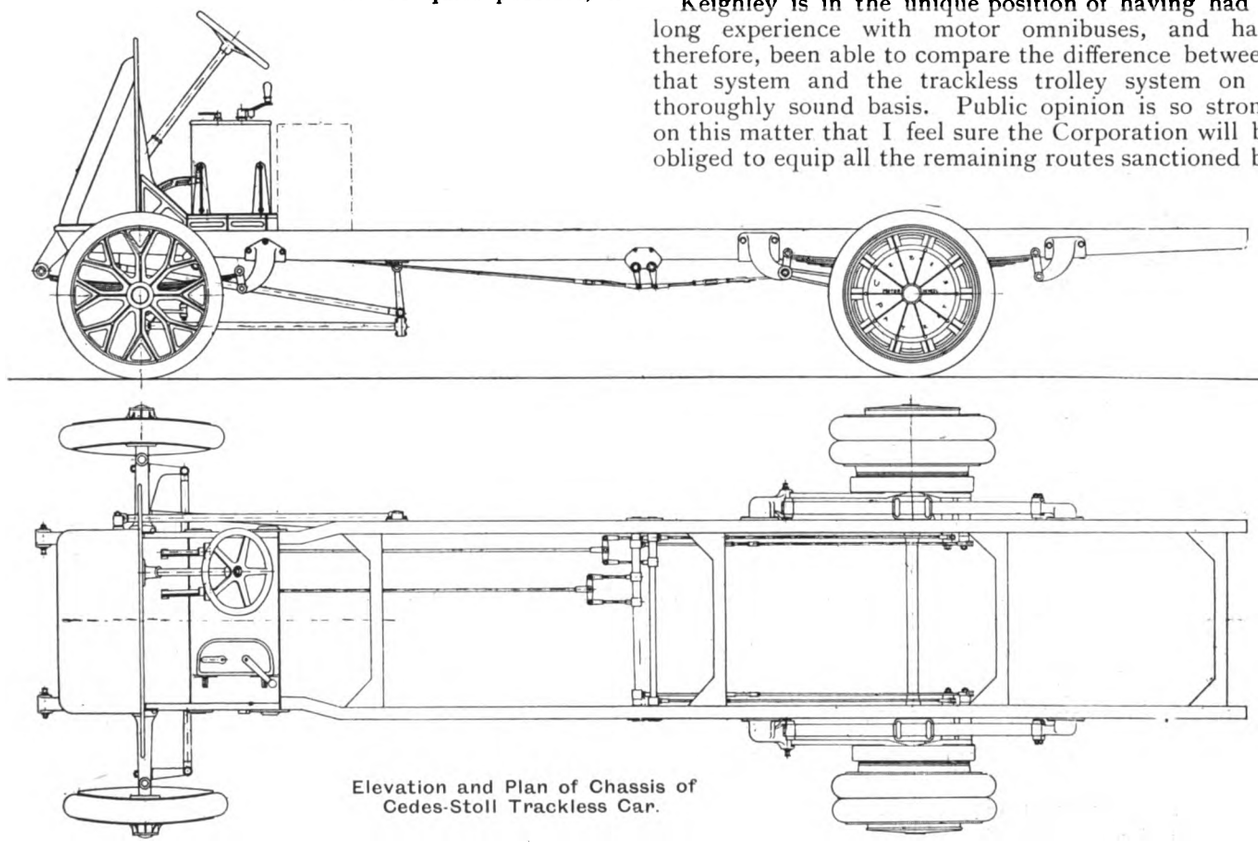
Several illustrations are shown of the actual vehicle in use at Keighley, together with some which give an idea of the overhead construction and method of current collection. It will be noticed that one of the illustrations shows a double-deck motor 'bus directly under the current collector, with two fairly tall men standing on the top deck, and yet leaving four or five feet clear head room below the pendulum, which keeps the little four-wheel carriage in its true position.



Wires at Single Line Terminus.

One of the other illustrations shows the simplicity with which the end of the line can be finished off without any circle, which is necessary with the under-running type of current collector in order to turn. In the other illustrations the vehicle is shown actually in motion.

I find that the best speed when going up hill, which is previously mentioned as 1 in 11 at places, seems to be about 8½ miles per hour, and it is, of course, not advisable to exceed this speed when coming down hill, but on the flat roads it would be quite possible, if desired, to reach 10 or 12 miles per hour without any detriment to the vehicles whatever.



Elevation and Plan of Chassis of Cedes-Stoll Trackless Car.

The following figures are claimed by the maker of the motors to be correct with a vehicle weighing 5 tons 4½ cwts.

1. Travelling on the level at 15½ miles per hour, 15 amperes at 500 volts would be consumed.
2. With a 5 per cent. gradient at 9½ miles per hour, 42 amperes at 500 volts would be consumed.
3. With a 10 per cent. gradient, travelling at 7½ miles per hour, 66 amperes at 500 volts would be consumed

The actual conditions in Keighley do not come exactly within any of these figures, but I find that when travelling at eight miles per hour, and allowing for stops on the road, and about 25 per cent. flat, that the actual electrical energy consumed averages 50 amperes at 500 volts.

At the present time we have had no necessity to cross an existing tramway trolley wire with an over-running system, but this is accomplished by a special fitting which allows for the two wires to pass above the tramway trolley wire, the tramway trolley wire being cut, and a small gap left between the two ends for the pendulum of the current collector and flexible wire to pass between. I have actually examined one of these fittings, and feel quite confident that they can be put into use with very little trouble.

In applying electrical energy for any power purposes, it is always desirable to get the motor direct on to the work, if possible, and in this respect the Cedes-Stoll hub motor wheel seems to be everything that can be desired.

In conclusion, the Visiting Committee, who were responsible for recommending the Cedes-Stoll system to the Keighley Corporation, have recently been inspecting other systems in actual operation, and I feel justified in saying that in each case every member of the committee came home again feeling quite satisfied with the system we have adopted.

I have endeavoured to write this article in a perfectly unbiased manner, and have only quoted actual facts as I have found them under practical every-day working conditions.

Keighley is in the unique position of having had a long experience with motor omnibuses, and has, therefore, been able to compare the difference between that system and the trackless trolley system on a thoroughly sound basis. Public opinion is so strong on this matter that I feel sure the Corporation will be obliged to equip all the remaining routes sanctioned by Parliament at the same time if they wish to avoid endless trouble with deputations from districts that are afraid of being left until the last.

Finally, it is a common human failing for every father to consider his own children the best, but in this case an opportunity has been given to the general public before deciding on the matter, and they have given their opinion strongly in favour of trackless trolleys as represented by the Cedes-Stoll system instead of the existing motor omnibuses.

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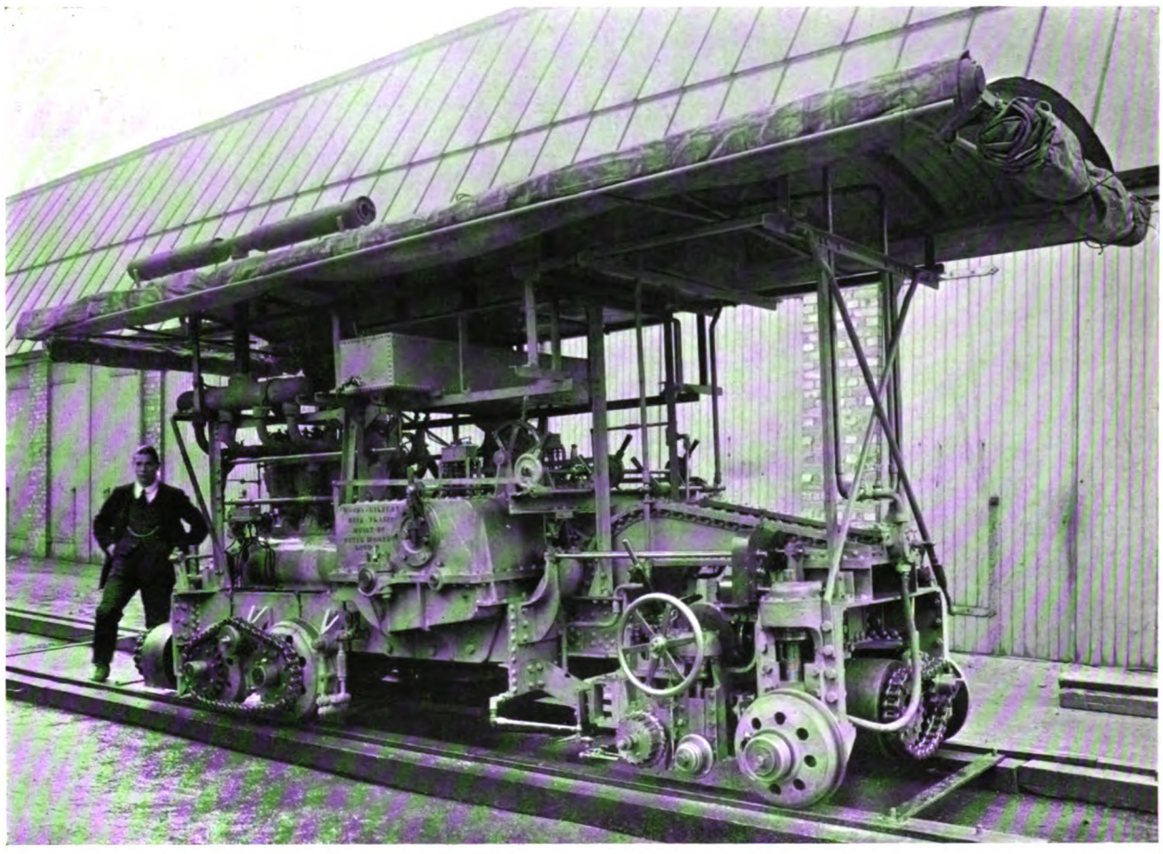
## RAIL-PLANING MACHINES.

PROLONGING THE LIFE OF RAILS.

At the present time, more than ever before in the history of electric tramways, the question of track maintenance, and particularly that of extending the life of rails, is of first importance. Most of the electric tramways in this country have now reached an age at which the extensive renewal of the tracks has become, or is on the point of becoming, a necessity, and the cost of this work is a very serious charge on the undertakings, already in many cases overburdened. Apart from the matter of corrugation on the rail tread, which may be removed by grinding, we have the trouble of the tread being worn down by the car wheels until the flange of the wheel bears on the bottom of the groove of the rail. This matter affects the tramway authority, but along with it is another which also affects the public, namely, the fact that the lip of the rail remains at about the original height, and thus forms an obstruction for general wheeled traffic. Then there is the further trouble of low joints, where fish-plate joints are used. It is also to be noticed that grinding for the purpose of removing corrugations without compensating deepening of the groove only hastens the day when the flange of the wheel will bear on the bottom of the groove. These troubles grow, until at length the tramway authority is obliged to pull up the track and lay new rails, at a cost of £2,000 or more per mile of single line. Various remedies have been proposed in the past, but none of them, with the exception of the welding of the joints, has come into use. Joint-welding is good in itself, but the whole length of the rail as well as the joints has to be taken into consideration. Given good substantial foundations to begin with, a new method of dealing with worn track is now available, which it is claimed adds 50 per cent. to the original life of the rails.

The essence of this method, which was first applied in Melbourne on the well-known cable tramways of that city, lies in two ingenious machines of the Woods-Gilbert Rail Planer Company. For some years this company have followed the requirements connected with the maintenance of tramway rails. They have succeeded in working out methods of remodelling the rails, which increase the life and remove corrugations and dishing at joints. A smooth-running track is obtained without any disturbance to rail or road-bed. The company have spent much money in constructing and perfecting their machines, and they have established a staff of engineers and mechanics specially skilled in the work. They are now in a position to enter into contracts with municipalities and tramway companies for the remodelling of rails. They also make preliminary investigations and submit proposals for carrying out the work.



Rail-Planing Machine for Re-Surfacing Worn Rails.

The remodelling of the rails, as already indicated, comprises the deepening of the groove, the cutting down of the guard lip, and the removal of the dish at joints and of corrugations. The work is performed by two different machines, a milling or cutting machine, and a surfacing or grinding machine. The function of the former is to deepen the groove and at the same time to cut down the projecting guard lip, thus giving on the average about 50 per cent. increased life to the rail beyond the ordinary period, and also minimising accidents to vehicles from the projecting lip. The milling machine is substantially constructed and of high-class material and workmanship. It is so accurately balanced and adjusted that it cuts out the rail groove to within $\frac{1}{64}$th of an inch of the standard depth under all conditions of track. This machine,

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of which a view is given in the accompanying illustration, weighs up to 15 tons, and it cuts the groove and guard lip of both rails on the track at a speed of about 9,000 ft. per month when at continuous work. As to the grinding machine, its capacity for surfacing the rails also amounts to about 9,000 ft. of single track per month. This machine removes the corrugations and also the dish and irregularities at joints, leaving the rails after the grooves have been cut with a smooth and even running surface. Both of the machines have suitable undergearing to enable them to be run along tracks at any desired speed when they are not engaged in remodelling work. They are quickly removed from the track and housed at depots along the routes. The work is carried out at night after the cars have stopped running, and the tracks are left clear in the morning. Practical experience has shown that the best results are obtained if the work is carried out before the defects have reached too pronounced a stage. In addition to the saving in capital cost of renewals, further economies are represented in the reduced cost of track and car maintenance.

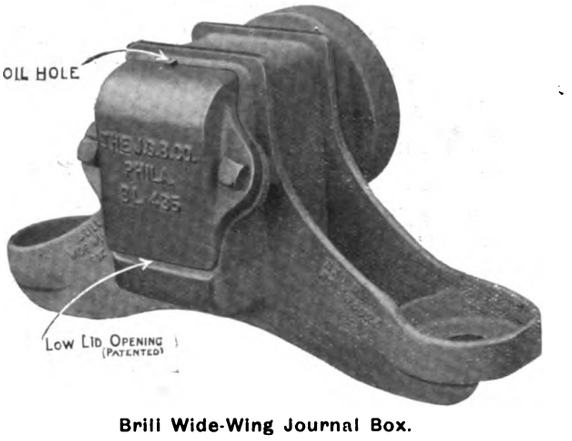
The mileage which has been remodelled up to the present is over 50 miles of single track. This includes work carried out on the Melbourne and the Brisbane tramways in Australia, together with the remodelling of the rails on the Oldham, Ashton, and Hyde tramways, in England. The machines were first put to practical work on the Melbourne tramways, and the highly satisfactory results established the soundness of the principle. In England the remodelling work at Ashton-under-Lyne has recently been in operation. Cardiff Town Council have passed a resolution recommending that part of their tramway tracks should be remodelled, and it is expected that the Woods-Gilbert Company will shortly start the work. A contract has been entered into for the remodelling of 200 miles of track in Sydney, New South Wales, and other lines are now under consideration.

Mr. G. S. Duncan, M.Inst.C.E., who carried out the construction of the Melbourne cable tramways, and has since been the consulting engineer of the Melbourne Tramway and Omnibus Company, was, we believe, the first tramway engineer to make use of the new method of rail reconstruction. On his advice the tramways company entered into a contract with the Woods-Gilbert Company for the resurfacing of 60 miles of rail. So satisfactory were the results that the contract was extended to cover 90 miles of rail. The contract stipulated that the cutting and reshaping of the rails should be carried out *in situ* and without damage to the tramway company's property, or to the public. Mr. Duncan acted as engineer in supervising the work, which he states was carried out to his complete satisfaction and to that of the tramway company and to the public. The chairman and managing director of the tramway company has also testified to the great improvement in the smoother running of the cars, and lessened expenditure on the cars and track for maintenance. In Brisbane a total of 6,775 ft. was cut out on the tread of the rail and 2,975 ft. in the groove. The tramway company find that the work has effected a very decided improvement in the comfort of the travelling public. It has also eliminated the hammering to which the cars were previously subjected. In Sydney the work of resurfacing the track is now being carried out by the Woods-Gilbert Company. The Oldham, Ashton, and Hyde Tramway Company are also well satisfied with what has been done on their tracks.

We may add that Mr. G. S. Duncan was so favourably impressed by the advantages and possibilities of the Woods-Gilbert system that he has been devoting considerable attention to the introduction of the new methods to tramway engineers and managers in this country. It is expected that a wide field of activity will be opened to the company as soon as it is understood that the new system offers a prospect of relief from the increasing burden of track maintenance and renewal. The process undoubtedly deserves the most thorough investigation, and we think it fortunate that its results can be inspected on a line so easily accessible as that of the Oldham, Ashton, and Hyde Tramway Company. The present offices of the Woods-Gilbert Rail Planer Company are at 32, Victoria Street, Westminster, S.W., where full particulars and estimates may be obtained.

## BRILL WIDE-WING JOURNAL BOX.

The illustration shows a journal box for single trucks, which has been recently placed on the market by the J. G. Brill Company. The outstanding feature of this new design is the construction of the lid opening, which is now brought down to a point considerably below the journal. In the old type of box with the high lid opening, it was impossible to get at the oiler in the box without jacking up the car and lifting the box off the journal. When hot-box and similar troubles occur, the car has now to be run back to the depôt before the oiler can be changed, causing loss of revenue while the car is out of service. With the Brill patented construction of lid all that is necessary is to swing the lid to one side; this exposes the oiler, which is then easily taken out by hand. Thus any oiler troubles can be instantly attended to on the road without putting the car out of service in any way, an improvement which will doubtless appeal to tramway managers.




**Brill Wide-Wing Journal Box.**

Another convenient arrangement that will be noted is the extra oil hole in the top of the lid for periodical or temporary oiling by merely unscrewing a plug in it, with very little loss of time.

This Brill wide-wing journal box is a registered design, and the low-lid opening above referred to is patented. The extended ears of this journal box have proved very successful in minimising end to end oscillation of cars, as it increases the lower spring base over 7 in. Another important point in connection with this wide-wing box is the effect it has in relieving sidebar stresses at the yokes. It is a lighter box than the old grey iron pattern, saving approximately 50 lb. per car, and being made in malleable iron is very nearly 12 per cent. stronger than the old pattern.

**Conveyance of Postmen.**—Contracts have been made with the Postmaster-General for the conveyance of postmen on the tramcars in Coventry and Southampton. In the former city the payment is £200 per annum, and the contract is for five years.



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LONDON, OCTOBER 16, 1913.

**Progress in Tramway Practice.**

Those departments of tramway work that are invisible to the public gaze afforded Mr. A. R. Fearnley, in his address from the chair at the Municipal Tramways Conference, more scope for congratulatory remarks than did the things that are visible. His chief reference to the latter was embodied in the remark that in those towns which were early in the field with electric traction, car bodies are already being redesigned and reconstructed, giving easier and safer access, covered top decks and increased carrying capacity. The more commodious platform mounted upon the radial truck, the improved bodies and means of entrance and exit with which the Liverpool Committee are experimenting, thanks to the inventive genius of their manager, and the double-deck car at Huddersfield that permits passengers to leave on the near side of the motorman's platform appear to constitute the only signs of progress for which British practice is responsible. Whenever a member of a tramway committee returns from a tour abroad and imparts his impressions to an interviewer, he invariably comments upon the greater facilities for speedy traffic afforded overseas by the single-deck cars. This advantage on the part of the Colonial car arises from the absence of the continuation of the dash board on the near side of the front platform, thus permitting that end to be used as the exit for passengers. Reference to the benefits of this system have often been made in these pages; and we have also pointed out that it is not a difficult matter so to arrange the staircases of a double-deck car as to permit of its institution here. It is one of the advantages that follow from the alterations of platform and staircase for the adoption of the payment-on-entry patents. If the Sheffield, Leeds, and Bradford managers, who are experimenting with the system of collecting top-deck fares on the platform, would arrange one or two cars for exit by the front end, they would probably find that much of the objection now raised to the practice would be obviated. The smoother working thereby ensured, the saving in running time, and the absence of two contending streams of humanity —one endeavouring to quit the car and the other to enter it—might lead them to follow the enterprise shown by Aberdeen and Leicester in experimenting with the prepayment system. There need be no fear of opposition being raised by the Board of Trade to a front platform exit, as a delegate suggested at the Conference. Huddersfield people are so pleased with the double-entrance car that they make it one of the show things for visitors. It is indisputable that the car economises time and almost entirely eliminates the risk of accident to passengers when alighting. The chairmen of the tramways committees of Leicester and Aberdeen are agreed in speaking of the beneficial effects of the prepayment system, especially with regard to the prevention of accidents. The managers of those undertakings who have adopted the method of collecting top-deck fares on entry could probably all confirm its value in that respect.

**Tramcar v. Omnibus.**

The subject which created the greatest interest at the Municipal Tramway Conference was the admirable and convincing paper by Mr. J. B. Hamilton dealing with the respective revenues and expenses from working tramways and motor omnibuses in large towns. Great was the disappointment that time would not allow longer discussion of the paper; so many members wished to speak that two or three hours more might have been profitably devoted to the subject. No attempt was made at

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detailed criticism of the figures put forward by Mr. Hamilton, but these figures and his calculations were the essence of the paper. From the point of view of the case which he was making out the figures appear to be unassailable; suggested modification would be much more likely to make the position of the omnibus less favourable still than to have the reverse effect. Excluding London, which is a special case, it appears that for the 27 towns in this country which have a population of over 150,000 the average tramway working expenses, excluding rates and road repairs but including interest and sinking fund, amount to 9·167d. per car-mile. The sums spent on road maintenance by the tramways and the sums they pay in rates on the tracks are calculated out, and when added to the profits of the undertakings give a total credit return to the ratepayers of no less than £1,642,356. If motor omnibuses were substituted the results would be very different. Mr. Hamilton took the working expenses of omnibuses, including interest and sinking fund, at the very moderate figure of 10d. per mile run, and he gave the omnibus the benefit of supposing that it would earn 80 per cent. of the receipts of a tramcar. Even thus it was shown that instead of there being a benefit to the public of over a million and a half annually, there would be a loss of £2,556,441. In this column we can give only these few striking figures, but Mr. Hamilton's paper and his reply to the discussion will be found in this issue; they should be carefully studied. The paper works out systematically and completely the results likely to arise if the views of automobile visionaries were ever put into practice. Some members of the Conference very properly pointed out that tramway men must keep their eyes open for developments of any kind, and the benefits of the omnibus in certain circumstances were not overlooked; but nothing was said which would qualify Mr. Hamilton's main contention for the case of large towns. The only hostile criticism—if it can be so called—came from Mr. Worby Beaumont, the technical adviser to the Commissioner of Metropolitan Police. Even his remarks in favour of omnibuses were qualified by the admission that in some cases tramways afford the best means of local transport. His plea for general traffic, especially in narrow streets, has little weight when one remembers that for a given volume of traffic omnibuses would have to be twice as numerous as tramcars. He indicated that a different interpretation might be put on some of Mr. Hamilton's figures, but made no attempt to do so. Tramway managers at least will clearly support Mr. Hamilton's conviction that the era of rail transit for urban districts shows not the slightest sign of being superseded by any other form.

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**Maintenance of Track Paving.**

No subject is at the present time of more importance to tramway owners than the incidence of cost for maintaining the surface of roads on which tramways are laid. Councillor Fenton's paper on the subject at the Sheffield Conference put the case very clearly and forcibly, and it elicited a useful discussion, which it may be hoped brought nearer the time when there will be a radical amendment of the archaic law that now impedes tramway development. The position may be considered from three points of view: that of the Corporation owning and working tramways on roads under their charge; the County Council working tramway lines on roads maintained by local authorities; and lines worked by companies on public roads. It was evident at the Conference that the differences which have hitherto militated against common action are gradually disappearing. Taking the first case quoted, it has been argued that if the tramways committee have to pay too much for their privileges they are at the same time relieving other departments which would otherwise, perhaps, show a loss in working. As was truly said at the meeting, municipalities ought to place their accounts on the most satisfactory financial basis possible, so that they would bear the keenest and healthiest criticism. For this purpose we venture to suggest that a standing committee be appointed by each Corporation to allocate the charges between the electricity, the highways, and the tramways committees. These standing committees might form the sort of municipal parliament suggested at the meeting. As a standard form of accounts has been adopted for the tramways, it would be advisable to have similar standards for the other departments. The figures thus obtained would be useful as forming a basis for the charges in the

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two other cases. By applying the data on which such charges were estimated to the varying conditions and different towns, it would be a comparatively simple matter also to settle what the local authorities should charge the London County Council, and what private companies should be called upon to pay for the use of the roads. A mass of information would be acquired in course of time, which would strengthen the hands of those who object to the antiquated notion of making tramways pay for paving those parts of roads they neither use nor injure. The standing committees would come to the conclusion agreed to at the Conference, namely, that as compared with tramless highways the tracks are a decided advantage in every way, and should be called upon to pay but a very small proportion, if any, towards the upkeep of the roads on which they are laid. The two Tramway Associations working with the urban, the municipal corporations', and the county councils' associations, should be able "to take such steps as will result in general and more equitable legislation with regard to the question of road maintenance."

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**The Wearing of Badges.**

In these days when trade unions have almost been perverted from their purpose by the propagation of pernicious doctrines, it is difficult to understand the frame of mind of men who wish to wear a badge in order to advertise their adherence to the various societies. The variety and number of these organisations connected with passenger transport by road vehicles suggests that some persons find them a profitable means of gaining a livelihood. Evidence of the length to which they will go in an effort to maintain a new organisation is to be seen at present in the fight of the Dublin employers against a man who, pleading that he has a "divine mission," has dragged other unions into the meshes of Syndicalism. Fortunately three circumstances have operated to prevent the Irish capital being handed over to the forces of anarchy, as was the case during the greater part of the five weeks when a Syndicalist movement initiated a general strike in Brisbane consequent upon the refusal of the tramways company to permit the wearing of badges. At Brisbane the agitators were allowed to force the fight after the company had suspended the badge wearers. In Dublin the specified grievances on the part of the employees were put forward by the man who endeavoured to hold up the Dublin service in order to secure recognition of himself. The courage of the chairman of the company, and the loyalty of the majority of the men—since recognised by a public subscription of nearly £1,000—encouraged other employers at last to resist the claims of the individual. Above all the Government have been firm in maintaining law and order, a virtue which was not apparent in the Brisbane case. There the refusal of the Federal Labour Government to send troops to assist the police, led to the agitators bringing business and the trade of the port to a standstill. Volunteer police had to be enrolled from various States before law and order gained the ascendancy. When the tramway men's claims were submitted to the Federal Arbitration Court the badge question was decided in their favour. London has just experienced a threat of having its omnibus service dislocated because of demands of a union organiser for the men to be allowed to wear his badge, and for himself, along with the company's chief officers, to constitute the final court of appeal in settling union men's grievances. Although only half of the employees are said to be members of the union, the employers averted trouble by agreeing to the requests, but it is satisfactory to note that the companies have laid down a stipulation that no employee is to be intimidated or interfered with in the discharge of his duties by any member of the union. It is in this matter that other trade unions, notably those connected with the coal and cotton workers, have lately shown an intolerance altogether foreign to the original intentions of trade unionism, and there are indications in two or three towns that the evil example is not lost upon some tramway unionists. The London County Council permit their tramway men to wear the badge, but it is the exception to see a man displaying it. Even the existence of Conciliation Boards does not prevent agitators raising a turmoil. This was shown by the commotion made last year in order to secure consideration for certain claims being given during instead of after the Council's vacation.

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# Municipal Tramways Association.

## Twelfth Annual Conference held at Sheffield,

**September 23rd, 24th, 25th, and 26th.**

The twelfth annual Conference of the Municipal Tramways Association (Incorporated), which was held at Sheffield from September 23 to 26, has added another to the list of successful meetings that this youthful but vigorous organisation has so usefully carried out. Of the utility of these gatherings there can indeed be no question. Municipal tramway enterprise has become a department of public work so vital and important that its influence is felt throughout the country. With the exceptions of Dublin, Bristol, and Edinburgh, every large town now works its own tramways, while most of the smaller towns also have their own installations. The interests of these undertakings are in many respects identical, and it is essential that there should be some organisation, some central clearing house, where difficulties may be brought forward, problems stated, solutions discussed, and needed changes initiated. That the Association attains the objects for which it was formed has been repeatedly demonstrated. The standardisation of municipal tramway accounts, for instance, which has been of incalculable benefit to undertakings both large and small, would, it may safely be said, never have been accomplished without the aid of the Association. The immediate result of the Conferences may occasionally seem inadequate, but it cannot be denied that they give an impetus to progress in various departments of the work which could be obtained in no other way. Town Councillors, therefore, do well to support the Association, and to send their delegates regularly to its public and private conferences. Appreciation of the work of the Association has increased steadily, and it it gratifying to note that the meeting at Sheffield formed a record in point of attendance. The delegates numbered over 175, and they represented 72 Corporations and Councils. Two allied associations were also represented, viz., the Incorporated Municipal Electrical Association and the Tramways and Light Railways Association. Mr. Worby Beaumont, the genial protagonist of the motor omnibus, was also a welcome guest.

The Association was most hospitably entertained by the Lord Mayor and Corporation of Sheffield. Everything possible was done to make the delegates' stay in the City enjoyable, and to enable the work of the Conference to be carried on under the most pleasant conditions. The Town Hall was placed at the delegates' disposal, the meetings being held in the large and finely proportioned Council Chamber.

The first session of the Conference took place on the Wednesday, but many delegates arrived on Tuesday and attended an informal reception in the evening at the Victoria Station Hotel, where they were received by Mr. A. R. Fearnley, president of the Association, and Mrs. Fearnley. Much disappointment was expressed at the absence of the chairman, Sir Wm. Clegg, who was at Wiesbaden, but his place was taken by Councillor A. T. Bescoby, vice-chairman of the Tramways Committee, who was accompanied by Alderman J. Knowles and Councillors W. Bakewell and T. G. Evans. During the evening an enjoyable musical programme was rendered. The preliminary gathering thus pleasantly arranged by Mr. Fearnley, gave the delegates a much appreciated opportunity of meeting friends, and of discussing informally the various items of the Conference on which they were to enter on the following day.

On Wednesday morning the Conference was formally opened, and the delegates received a cordial welcome from the Lord Mayor of Sheffield (Alderman S. Osborn, J.P.), who alluded to the importance of the tramway system to the city of Sheffield. They had, he said, been fortunate in being served by two tramway managers who had proved themselves to be at the forefront of their profession. Of Mr. Fell's inauguration of their tramway undertaking they had the most grateful and pleasant recollection, and Mr. Fearnley, who succeeded him, had met the increasing demands and faced the increasing difficulties in a manner beyond all praise. He (the Lord Mayor) had only one regret in connection with the Congress, and that was the absence of the chairman of the Tramways Committee, Sir William Clegg, from whom he had received a letter, which he read to the Conference. In this Sir William extended a cordial welcome to the delegates, and expressed his regret at being unable to arrive in Sheffield in time to express to them personally his pleasure that the Association had elected Mr. Fearnley as president of the Association. Councillor A. T. Bescoby, vice-chairman of the Tramways Committee, supported the welcome extended by the Lord Mayor, and Alderman J. Miles, chairman of Bolton Tramways Committee, and Mr. A. L. C. Fell, chief officer of the London County Council Tramways, responded on behalf of the delegates.

Mr. A. R. Fearnley then read his presidential address, which was followed with close attention. Although, as he said, there had been no very striking developments since the last Conference, his address showed that the year during which he had presided over the work of the Association had been by no means uneventful. In touching upon various matters, the President gave evidence of a thorough knowledge of the problems that confront tramway owners in various parts of the country, and his comments are well worth the attention not only of members of the Association, but of all who take an interest in the questions of local transport. His summary of the position as respects the motor omnibus could hardly be bettered :

> "Good types of motor vehicles can be obtained. The carriage portion is, however, somewhat crude and ugly, and provides limited accommodation as compared with that to which tramway passengers are accustomed. There are very few roads in the provinces which are yet really suitable to such a vehicle. It is now probably more a problem of the road than of the vehicle."

While he saw little likelihood of the motor omnibus taking the place of the tramcar for heavy traffic, he

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The Municipal Tramway Conference Group.

[*Henderson, Sheffield.*

*Photo by*]

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recognised the value of the omnibus as an adjunct to tramways. Sheffield had ordered 10 omnibuses, and they would no doubt need others. In this, as in other matters, Mr. Fearnley took statesmanlike views, and expressed them tersely and well.

A cordial vote of thanks having been given to the President for his address, Alderman S. Flint, chairman of Leicester Corporation Tramways Committee, read a paper on "Platform Fare Collection." This dealt with a subject about which much controversy has arisen, viz., the P-A-Y-E system, which was recently adopted for one route in Leicester. Alderman Flint's account of the success of that system is clear and emphatic. "Accidents from injuries through attempting to board or alight from cars when in motion are *nil*. Motormen and conductors are very much in favour of the system. Such objections as were at first made by passengers have now all been met." At the present time there is, in the author's opinion, "nothing to which any reasonable person could raise objection"—emphatic testimony which shows, at least, that the system must be carefully considered. In the discussion which followed, Councillor J. A. Smith, chairman, Aberdeen Tramways Committee, was equally positive of the benefits they had derived from the system. In fact, all of the speakers who had practical acquaintance with the new method spoke in high praise of it.

The afternoon was devoted to Councillor W. C. Fenton's paper on the "Maintenance of Paving on Tramways as Affected by Section 28 of the Tramways Act, 1870." The case for effective revision was fully established by the author, and he was strongly supported by Councillor C. F. Spencer, of Halifax, who opened the discussion. This was well maintained, with much animation and cogency; and if argument could affect the action of a Government indifferent to all but political matters, the tramway industry would not have to wait long for a new charter. The paper and discussion have, however, put the matter in a strong light, and it is scarcely possible that it will be allowed to remain in its present condition indefinitely. The sitting was continued until late in the afternoon, and subsequently the members inspected several railless omnibuses from Bradford and Rotherham, which were run on a short section of line specially erected for the occasion on a steep gradient not far from the Town Hall.

In the evening, at the invitation of the Sheffield Tramways Committee, the delegates attended a performance of "Kismet," at the Lyceum Theatre, a large part of the house being specially reserved for the party. Afterwards the Lord Mayor entertained the members and other guests at supper in the parlours of the Town Hall. The tables were handsomely decorated with flowers, and the rooms presented an attractive scene.

On Thursday morning the delegates assembled in force to hear Mr. J. B. Hamilton's paper on "Urban Passenger Transport." This was by common consent *the* paper of the Conference, and the members had looked forward to an important discussion. Unfortunately the time available proved far too short to enable more than a few of those who desired to speak to take part, and as a consequence much disappointment was felt. As treated by Mr. Hamilton, the topic resolved itself into the keenly debated question of motor omnibuses *v.* tramways. No one is, perhaps, better qualified to discuss this matter than the author. He has had a long experience of various forms of traction, including motor omnibuses, and is well-known to believe in the future of railless traction. He thus approached the subject without bias, and considered it strictly from the point of view of one desirous only to ascertain what methods are best adapted to urban service. Mr. Hamilton's study of the problem has led him to form one conviction which stands out clear and distinct in his mind, and that is that "the era of rail transit shows not the slightest sign of being superseded by any other form." Time, we think, will prove Mr. Hamilton's view to be as accurate as his review of the present position is broad-minded and able. He has conferred a great service on tramway owners, and we trust that his paper will be widely read.

On the adjournment of the Conference, the delegates and guests were again entertained at luncheon at the Victoria Station Hotel, by the Sheffield Tramways Committee, and later special cars and motor omnibuses took them to visit the works of Messrs. Edgar Allen and Co., Hadfield's Steel Foundry Co., and Messrs. S. Osborn and Co. (the Titan Trackwork Co.)

In the evening the annual dinner of the Association was held at the Victoria Station Hotel. Mr. Fearnley occupied the chair. A large company was present and among the guests were the Lord Mayor of Sheffield and the Lady Mayoress. A report of the proceedings is given in the following pages.

The Conference was concluded on Friday morning by the annual business meeting. As stated in our report, Alderman H. Linsley, chairman of Salford Tramways Committee, was elected president for the ensuing year, and Mr. Peter Fisher, general manager of Dundee Corporation Tramways, vice-president. Mr. C. J. Spencer, the popular honorary secretary and treasurer, was re-elected, and Mr. G. W. Holford, general manager of Salford Corporation Tramways, was elected a member of the Executive Council.

On the conclusion of the meeting, the members made an excursion to the Dukeries, thus terminating one of the most interesting and enjoyable Conferences that the Association has held. The arrangements throughout were admirably planned. Everything went with a ease and smoothness that testified to the care and forethought of capable organisers, and Mr. Fearnley and Mr. Spencer, upon whom fell the principal burden, and their assistants, received the cordial thanks and congratulations of the members.

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LIST OF DELEGATES.

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| Aberdeen .. .. | Coun. J. A. Smith, chairman.<br>R. S. Pilcher, manager. |
| Accrington .. | Coun. T. Morley.<br>H. Pilling, manager. |
| Ashton-under-Lyne | Coun. R. S. Oldham, chairman.<br>E. Holt, manager. |
| Ayr .. .. .. | Bailie P. S. Ferguson, chairman.<br>W. Grant, manager. |
| Belfast .. .. | Ald. J. S. Finnigan, vice-chairman.<br>Ald. J. Tyrrell, J.P.<br>A. A. Blackburn, engineer. |
| Bexley U.D.C. .. | Coun. E F. Reid, vice-chairman.<br>H. P. Stokes, manager. |
| Birkenhead .. | Coun. H. Halsall, chairman.<br>C. Clarke, manager. |
| Birmingham .. | Coun. H. Barrow, chairman.<br>Ald. W. H. Bowater.<br>A. Baker, manager. |
| Blackburn .. .. | Coun. C. Higham, vice-chairman.<br>J. H. Cowell, manager. |
| Blackpool .. .. | Ald. J. Brodie, J.P., chairman.<br>Coun. Holt, vice-chairman.<br>C. Furness, manager. |
| Bolton .. .. | Ald. J. Miles, chairman.<br>Coun. H. Hill.<br>J. Barnard, manager. |
| Bournemouth .. | Coun. A. Davis, chairman.<br>Coun. R. F. Godfrey, vice-chairman.<br>I. Bulfin, manager. |
| Bradford .. .. | Coun. E. Priestley, chairman.<br>Coun. S. C. T. Neumann, vice-chairman.<br>C. J. Spencer, manager.<br>T. Stirk, traffic superintendent.<br>J. W. Dawson, assistant engineer.<br>J. W. Falkingham. |

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| Brighton .. .. | Ald. Wilson, chairman.<br>W. Marsh, manager. |
| Burnley .. .. | Coun. E. Heap, chairman.<br>Coun. Irving, vice-chairman.<br>H. Mozley, manager. |
| Burton-on-Trent .. | A. B. Slater, manager. |
| Bury .. .. | Ald. T. S. Collinge, chairman.<br>Coun. Hargreaves, vice-chairman.<br>W. Clough, manager. |
| Chester .. .. | Ald. J. Jones, chairman.<br>J. Gardner, manager. |
| Chesterfield .. | Ald. E. Shentall, chairman.<br>Coun. J. E. Clayton, vice-chairman. |
| Colchester .. .. | R. C. Bullough, manager. |
| Coventry .. .. | Coun. M. K. Pridmore, chairman.<br>T. R. Whitehead, manager. |
| Croydon .. .. | Ald. J. Trumble, J.P., deputy mayor.<br>T. B. Goodyer, manager. |
| Darwen .. .. | R. W. Smith-Saville, chief engineer.<br>F. J. S. Hosken, manager. |
| Derby .. .. | Coun. J. Dean, J.P., vice-chairman.<br>F. Harding, manager. |
| Doncaster .. .. | Coun. P. Stirling, chairman.<br>Coun. W. D. Borrill.<br>E. S. Rayner, manager. |
| Dundee .. .. | Coun. G. A. Johnston.<br>Coun. W. H. Buist.<br>P. Fisher, manager. |
| East Ham .. .. | Coun. W. T. Howlett, chairman.<br>Ald. C. Northfield, J.P., mayor.<br>W. C. Ullmann, manager. |
| Erith U.D.C. .. | A. Coveney, manager. |
| Exeter .. .. | Coun. F. Chick.<br>H. C. Bartlett, manager. |
| Glasgow .. .. | Bailie Kirkland, convener.<br>Bailie Alston, sub-convener.<br>J. Ferguson, chief engineer.<br>L. Mackinnon, traffic superintendent. |
| Gloucester .. .. | L. Johnston, manager. |
| Halifax .. .. | Coun. C. F. Spencer, chairman.<br>Coun. A. Fawcett, vice-chairman.<br>Coun. A. Seed.<br>J. D. Caird, traffic manager.<br>J. W. Galloway, engineer. |
| Huddersfield .. | Ald. J. H. Aston, J.P., chairman.<br>Ald. J. Taylor, vice-chairman.<br>R. H. Wilkinson, manager. |
| Hull .. .. | Ald. E. Robson, J.P., chairman.<br>Coun. J. Hargreaves, J.P., vice-chairman.<br>W. J. McCombe, manager.<br>J. Wilkinson, electrical engineer. |
| Ilford U.D.C. .. | L. E. Harvey, manager. |
| Ilkeston .. .. | Ald. S. Shaw, chairman.<br>Coun. W. Tatham, vice-chairman.<br>L. C. F. Bellamy, manager. |
| Lancaster .. .. | Coun. T. Wilkinson.<br>G. C. Milnes, manager. |
| Leeds .. .. | Ald. C. F. Tetley, chairman.<br>Ald. H. Brown, vice-chairman.<br>J. B. Hamilton, manager.<br>A. Daggett, traffic superintendent. |
| Leicester .. .. | Ald. S. Flint, J.P., chairman.<br>Ald. G. Banton, J.P., vice-chairman.<br>A. F. Lucas, manager.<br>T. R. Smith, electrical engineer. |
| Leith .. .. | Judge Hall, chairman.<br>F. A. Fitzpayne, manager. |
| Leyton .. .. | Coun. H. Heather, chairman.<br>F. Schofield, manager. |
| Liverpool .. .. | Ald. F. Smith, chairman.<br>Major R. J. Clarke, vice-chairman.<br>C. W. Mallins, manager. |
| London C.C. .. | W. J. Squires.<br>A. L. C. Fell, chief officer. |
| Lowestoft .. .. | H. H. Saunders, manager. |
| Maidstone .. .. | Coun. D. T. J. Lyle, chairman.<br>A. T. Lambert, manager. |
| Manchester .. | Ald. J. Bowes, chairman.<br>Coun. A. W. Chapman, vice-chairman.<br>J. M. McElroy, manager. |
| Newcastle-on-Tyne | Coun. J. H. Rodgers, chairman.<br>Coun. R. Mayne, vice-chairman.<br>E. Hatton, manager. |
| Newport .. .. | Coun. John Moxon, chairman.<br>N. J. Young, manager.<br>A. Nichols Moore, borough electrical engineer. |
| Northampton .. | Coun. T. D. Lewis, chairman.<br>Coun. W. Beale, vice-chairman.<br>J. Gottschalk, manager. |
| Nottingham .. | Coun. R. H. Swain, chairman.<br>Ald. F. R. Radford, vice-chairman.<br>J. Aldworth, manager.<br>W. Boot, rolling stock superintendent. |
| Oldham .. .. | Coun. F. G. Isherwood, J.P., chairman.<br>Ald. F. Elliott, vice-chairman.<br>J. W. Dugdale, manager. |
| Perth .. .. | Coun. J. Moncrieff, chairman.<br>W. G. Snell, manager. |
| Plymouth .. .. | C. R. Everson. |
| Portsmouth .. | Ald. J. H. Corke, J.P., chairman.<br>Coun. J. Timpson, vice-chairman.<br>W. R. Spaven, manager. |
| Preston .. .. | Coun. S. Crompton, chairman.<br>Ald. J. Ormrod, vice-chairman.<br>J. F. Simpson, manager. |
| Rawtenstall .. | Ald. H. Coupe, chairman.<br>C. L. E. Stewart, manager. |
| Reading .. .. | Ald. C. G. Field (mayor), chairman.<br>G. F. Craven, manager. |
| Rochdale .. .. | Coun. J. P. Fielden, chairman.<br>Ald. Wm. Cunliffe, mayor.<br>G. Webster, manager. |
| Rotherham .. | Ald. D. L. Winter, chairman<br>Coun. T. Reeves, deputy-chairman.<br>Ed. Cross, manager. |
| Salford .. .. | Ald. H. Linsley, chairman.<br>Coun. B. Littler.<br>G. W. Holford, manager. |
| Sheffield .. .. | Coun. A. T. Bescoby, vice-chairman.<br>Ald. J. Knowles, chairman Engineering Committee.<br>A. R. Fearnley, manager.<br>H. E. Yerbury, electrical engineer.<br>A. Handford, traffic superintendent. |
| Southampton .. | Ald. F. A. Dunsford, chairman.<br>H. F. Street, manager. |
| Southport .. .. | Coun. T. S. Richardson, chairman.<br>Coun. J. Campion, vice-chairman.<br>T. J. Kendrew, manager. |
| South Shields .. | Coun. J. W. Henderson (mayor), vice-chairman.<br>W. T. Robson, manager. |
| Stalybridge .. | Ald. R. Wood, deputy chairman.<br>F. Schofield, commercial manager. |
| Stockport .. .. | Ald. C. Sharples, chairman.<br>Ald. W. E. Hamnett, vice-chairman.<br>A. T. Eardley, manager. |
| Sunderland .. | Coun. G. New, J.P., chairman.<br>Coun. W. Walker, vice-chairman.<br>A. R. Dayson, manager. |
| Wallasey .. .. | Coun. J. Farley, chairman.<br>Lieut.-Col. R. R. Greene, manager. |
| Walsall .. .. | Ald. J. Cope, chairman.<br>Ald. J. Williams, vice-chairman.<br>R. L. Horsfield, manager. |
| Walthamstow U.D.C. | Coun. E. Samuels, chairman.<br>W. Murray, manager. |
| Warrington .. | Ald. J. Smethurst, chairman.<br>Coun. J. Wilkinson, vice-chairman.<br>J. Telfer, manager. |
| West Ham .. | Ald. W. G. Spittle, J.P., mayor.<br>Ald. H. W. Littler, chairman.<br>J. S. D. Moffett, manager. |
| West Hartlepool .. | C. Burgess. |
| Wolverhampton .. | Ald. S. Craddock, vice-chairman.<br>W. A. Luntley, manager. |
| York .. .. | J. W. Hame, manager. |

THE INCORPORATED MUNICIPAL ELECTRICAL ASSOCIATION.—Mr. R. A. Chattock (Birmingham) and Mr. S. E. Fedden (Sheffield).

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.—Mr. H. England (Wakefield) and Mr. H. M. Sayers (London).

EDINBURGH CORPORATION.—Mr. A. H. Campbell and Councillor J. Harrison.

Other guests included Messrs. C. E. Ady, E. S. Barralet, H. E Blain, F. Bland, W. Worby Beaumont, A. E. Cave, W. H. Dixon, T. C. Elder, W. E. Freir, W. J. Hadfield, R. J. Howley, W. E. Ireland, A. M. Jacks, F. H. Masters, H. F. Maynard, F. M. Osborn, E. Osborn, J. A. Panton, Geo. Pearson, W. B. Pickering, A. W. Shepherd, B. A. Tapps, W. H. Turner, W. Vaux, T. W. Ward, and A. M. Willcox.

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**WEDNESDAY, SEPTEMBER 24.**

## THE OFFICIAL RECEPTION.

The first session of the Conference was convened in the Council Chamber of the Sheffield Town Hall, under the chairmanship of the President of the Association (Mr. A. R. Fearnley, general manager, Sheffield Tramways), on Wednesday, September 24, 1913, at 10-15 a.m. when the Lord Mayor of Sheffield, the Vice-Chairman, and members of the Sheffield Tramways Committee extended an official welcome to members of the Conference.

The Right Honourable The LORD MAYOR OF SHEFFIELD (Alderman S. Osborn, J.P.), who on rising to speak was received with loud applause, said: Mr. President and gentlemen,—I have the greatest pleasure, in the name of the City of Sheffield, and in particular on behalf of the Corporation, in extending to your Association a most cordial welcome to our city, and in expressing the earnest hope that your visit here will be one of the greatest possible pleasure and profit to yourselves, as we know it will be to us. We much appreciate the opportunity of welcoming such an august body as the society which is now assembled in this room. The only regret I think I have to express is at the absence of the chairman of our own Tramway Committee, Sir William Clegg. I will not say Sir William Clegg is undergoing a much needed course of treatment, but he is undergoing a well-deserved holiday at one of the health resorts on the Continent, and to Sir William Clegg this city is enormously indebted for the great success of its tramway undertaking. (Hear, hear.) I think I cannot do better than read to you a letter I have received from Sir William Clegg; it is dated September 19 at Wiesbaden. He says:

"My dear Lord Mayor,

I am sorry to find that I shall not be able to arrive in Sheffield in time to join you in extending a most cordial welcome to the members of the Tramway Association on the occasion of their honouring the city by holding its Annual Conference in Sheffield.

I am the more sorry for this as Mr. Fearnley is the President, and I should have liked to have personally voiced my expression of pleasure to the Association for electing him to that position. They have shown that they have appreciated the service he has rendered to it in his capacity as Secretary and as Vice-President almost as much as I appreciate the service Mr. Fearnley has rendered to me and the tramway undertaking. But I know that you and my colleagues on the Committee will do all that is necessary to make the Association's visit not only a pleasurable but a profitable and educational one, in the interests of tramway undertakings.

I am one of those who do not altogether look with a friendly eye on conferences as a rule, as I am very much afraid they indulge in too much pleasure with a minimum of educational cultivation, but I know from personal knowledge and observation that such is not the case with the Tramways Association.

Will you kindly express my renewed regrets at my inability to be present, and the hope that in every respect the Conference will be the most successful of all its predecessors, and that the delegates and their friends will have reason to remember their visit to Sheffield with much pleasure and gratification.

With kind regards,

Yours faithfully,

(Sd.) WM. E. CLEGG."

We in the city of Sheffield realise the civic importance of this gathering, representative of tramways in all large areas, especially those which are thickly populated. From whatever point of view one regards a tramway undertaking, it seems to me to be an advantage. Particularly in our own instance, I think, has it helped more than anything else to solve what might have been—especially in this time of increasing population and the boom in trade—a very serious problem of housing. The cheap transit by them from one residence to another, and from the men's and from everyone's residence to his daily occupation, has done a great deal to relieve the pressure we should otherwise have been feeling in this time of trade boom.

We welcome your profession here because you embrace a Society whose members have to have, not only an extensive but a very particular knowledge of all branches of engineering, from ordinary mechanical to electrical and civil. You also have to be expert financiers, and you have to be commercial men of the very first grade.

Sheffield has been fortunate in being served by two tramway managers—men who have proved themselves to be at the forefront of their profession. (Hear, hear.) Of Mr. Fell's inauguration of the tramway undertaking we have the most grateful and pleasant recollections in Sheffield, and now Mr. Fearnley has succeeded him, and not only maintained the good work he inherited, but met the increasing demands and faced the increasing difficulties, which from time to time have been placed upon him, in a manner beyond all praise. (Hear, hear.) It is not often we have the privilege of expressing our appreciation of the work done by our public servants, and I have the greatest possible pleasure and confidence in saying that we have one—and not the only official in charge of a responsible department of this city—who carries the fullest confidence and respect of every member of the body corporate. (Applause.)

But, of course, a manager is powerless unless he has a loyal staff and Mr. Fearnley and his predecessor have been supported by most loyal and capable staffs. The success of our undertaking could only have been reached—and I suppose the same obtains in all cities—by such hearty and complete co-operation, and we tender on this occasion our sense of gratitude to every member and every servant of the Corporation Tramways Department who has realised that he has a public duty as well as that he is earning his own livelihood. Well gentlemen, we welcome you here, and all sections of the community welcome you. I think one may say, not only does the commercial community welcome you, but the humblest denizen of this city also welcomes you. Those of us who are interested in commerce have a lively sense of the commercial interest Sheffield has in tramway undertakings. We are conscious of the fact that our city, from the beginning of the great tramway development, has taken a foremost place in the supply of tramway appliances, and we have every reason to believe that Sheffield will maintain that position, and increase its reputation and facilities for meeting your requirements. May I say too that the humbler citizens, the working men of Sheffield, also appreciate the services rendered by such gentlemen as yourselves.

The relations between the Tramway Committee and their servants in Sheffield, I think I may say, have always been friendly. There have been times of difficulty, and quite recently we seem to have passed through a critical period, but I am glad to say there are signs of its disappearing through the goodwill and the sensible way in which the problem has been looked at by both sides. I am very glad that amongst the many things Mr. Fearnley can show you, he has not to show you how to manipulate a tramway strike, and I hope that will be an art he will never have the occasion of learning to exercise. (Hear, hear.) Now, gentlemen, I conclude by repeating my first words of welcome, and I earnestly hope that your meetings here will have the greatest possible success and prosperity. (Loud applause.)

Councillor A. T. BESCOBY (vice-chairman, Sheffield Tramways Committee): My Lord Mayor, Mr. President, and gentlemen,—In the absence of Sir William Clegg, the chairman of the Tramways Committee, I desire as deputy-chairman to take the opportunity of supporting the welcome which the Lord Mayor has extended to you as delegates of an important Association, which is charged with looking after the interests of municipalities in their tramway and omnibus work. This is your first visit to Sheffield, and we as a committee intend to make your visit a social and pleasant one in every possible way. We are delighted you have accepted the invitation in such good numbers, and to know that interest in the work of the Association tends to increase each year. The city of Sheffield, and some of its industries and works, are well known to a number of the delegates present who have found it necessary from time to time to visit those works to inspect material ordered for use on their tramways. To those who do not know the city it will be interesting to find that, in addition to the huge industrial side, there is also another side which contains beautiful and interesting country, some of which it is hoped will be shown to the ladies who have accompanied the delegates to the Conference when they pay their visit to Haddon Hall, and take tea with the Lady Mayoress at Grindleford to-morrow afternoon. During the Conference we shall have further opportunities of adding to the information already placed in your hands regarding our municipal tramways, in which the citizens take a great interest, and the successful working of which is a source of gratification to the members of our Tramways Committee. We are pleased that, owing to our general manager holding the position of President of the Association, we have had the opportunity of inviting you to our city. To all the delegates we extend a hearty welcome, and I trust we shall have a very successful Conference. (Hear, hear.)

Now, as our chairman, Sir William Clegg, is not present here to-day, I wish to tell you that he has been very interested in the gathering of this Conference here to-day. Before he went away, it was his wish that we should give every delegate present a real Yorkshire welcome—a Sheffield welcome—and all that lay in his power to do he has done to make this Congress a success. You are all tramway men and experts, and I do not know that I can show you anything new in the city of Sheffield, but we, the Tramway Committee and the inhabitants of this city, are proud of our Sheffield tramways. We can show you perhaps one useful thing; that is how to run three or four miles for the universal penny fare, and I dare say you will find many other things interesting in this our city. We think that our tramways are one of the best, and the best regulated in this country of ours. (Hear, hear.) We think they are thoroughly up-to-date, and we are going to keep them so, and follow any improvements made by the larger cities of this country, if they can show us anything we have to learn or benefit by. Now, gentlemen, the Tramways Committee give you a very hearty welcome here to-day. We are pleased to see you all, and I hope you will go away with pleasant memories of the city of Sheffield. (Applause.)



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Alderman J. MILES (chairman, Bolton Tramways Committee): Mr. President,—I have been charged with a very important and delightful duty; it is to move that the best thanks of the Municipal Tramways Association be extended to the Right Hon. the Lord Mayor of Sheffield, the chairman and vice-chairman of the Tramways Committee, and the Committee itself, for the very cordial welcome extended to the delegates present this morning. You will all realise quite well that for a gentleman with the multifarious duties of the Lord Mayor of a city like Sheffield to come here and give us the kindly welcome he has done is a very great act of kindness, and I am sure we all appreciate it very highly indeed. (Hear, hear.) We all hope and believe that this Conference is going to be one of the very best we have had, and to know that the Tramways Committee and the Corporation generally are doing their best to make it so gives us much pleasure. We are very pleased indeed to hear from the vice-chairman of the wonderful success, the admirable management, and the splendid organisation of the Tramways Committee here. I am not going to occupy time—there is a good deal of work to be done this morning—but I do earnestly hope you will give this resolution more than an ordinarily hearty reception. I am sure you will do that, and that we all hope that the great city of Sheffield, with its wonderful organisation and wonderful industries, may prosper, and be as prosperous as we believe it is to-day for a great number of years to come. I therefore conclude with the resolution I have moved, and I ask for it a very hearty welcome from you. (Loud applause.)

Mr. A. L. C. FELL (chief officer, London County Council Tramways): My Lord Mayor and gentlemen,—I have very great pleasure in seconding this resolution of thanks to you for the very kind manner in which you have received the delegates to this Congress. I have also to thank you personally for your very kind reference to my small services

Sheffield Town Hall.

in Sheffield. I spent something like seven years in Sheffield, and they were certainly seven years of fairly hard labour, but it was a labour of love, and I feel very happy to-day to come back and find the tramways which I had the honour of installing still running, and running so efficiently under the splendid management of your Mr. Fearnley. I think it is a splendid thing to have a Tramway Conference in a city like Sheffield, where you have practically tried everything that can be tried in the tramway world. You have now filtered things out, so that you have the very best, and I think we have very much to learn here, and the delegates will find it worth while to study the Sheffield tramway undertaking. I thank you very much on behalf of the delegates for your very kind reception. (Applause.)

The vote having been carried with the greatest enthusiasm,

The LORD MAYOR OF SHEFFIELD said: Alderman Miles, Mr. Fell, and gentlemen,—I am very much obliged for the kind things you have said. All I can do is to repeat and emphasise the sincerity and heartiness of our welcome, and assure you that Sheffield's motto is always to go for the best and have the best; and while we hope that you will have more successful gatherings in the future than this one will be to-day, we hope that as far as it goes it will prove to be the best up-to-date. I thank you again, gentlemen. (Applause.)

The PRESIDENT: Now, gentlemen, having so successfully got through the pleasant opening of our Congress, I am compelled to inflict upon you what is called the Annual Presidential Address. I have tried to see that it should not be of undue length, and I trust you will bear with me for a few minutes while I read it.

## PRESIDENTIAL ADDRESS.

BY A. R. FEARNLEY

*(General Manager, Sheffield Corporation Tramways).*

Although it cannot be said that there have been any striking developments in the tramway world since our last Conference, yet important matters have come up for decision or review in tramway operation. In a number of directions, steady improvement and progress have taken place, and your Association has continued to take a keen interest in all these movements and developments, and to watch over the interests of the municipalities in this portion of their work.

Municipal tramways, at any rate, are not marking time in any way, and no better proof of this could be given than the applications to Parliament for Provisional Orders which have been made during the past year to extend tramways and to obtain additional powers in other directions connected with passenger traffic. Nineteen such applications were deposited in Parliament by municipalities at the beginning of the year, relating wholly to or containing clauses as to tramways, motor 'buses, or railless traction powers.

In actual tramway operation, improvements are constantly being brought about. There is a tendency on all our systems to improve "running time" as we term it, and (if the Sheffield system is a fair sample of what is going on in other municipalities) large sums are being spent in removing small equipments with which cars were fitted 12 or 14 years ago, and replacing them with equipments double the size and of an improved type—the interpole motors having proved a success and now being generally adopted as more capable of coping with the heavier traffic requirements of to-day.

In those towns which were early in the field with electric traction, car bodies are already being re-designed and re-constructed, giving easier and safer access, covered top decks and increased carrying capacity. Speeds are gradually being increased, with the consequent result that calls have been made upon the power house and permanent way branches of the department earlier than they would have been under the old condition of things.

As a result of the experience gained, better work is being put into tramway tracks to-day than at any time previously in the history of the undertakings—it being particularly noticeable in connection with this work that the mechanical joint is rapidly becoming obsolete, and welded joints, either electrical, "Thermit," or cast, being almost universally adopted.

The idea of isolating the tramway power house from the other supply stations in the district is, in consequence of the experience gained in many different parts of the country, now being abandoned, and in this city we hope before the end of the year to have completed arrangements by which any of the three power houses will be available for tramway supply in case of heavy load and at other necessary times. In other words, the plant which is being used during five-and-a-half days in the week to supply power to the large works in the east end of the city, will be available for our week-end, bank holiday, and football traffic. The arrangement promises to work out in an economical manner for both the Tramway and Electric Supply Departments, is in the best interests of the city as a whole, and is certainly a necessary insurance for the continuity of the electric supply service of the city.

All these improvements mean that large sums are being spent on renewals, and also that some additions are being made to capital account. In addition, demands for more frequent services have to be met, with a consequent tendency to bring about such a reduction in receipts per car-mile that final results only leave small margins per mile between total expenses and total receipts, which small margins, however, when multiplied by the ever-increasing number of car-miles run, produce what are in most towns—all conditions considered—undoubtedly satisfactory results.

The hours of labour and rates of wages of employees are steadily, but regularly, being improved in most of the municipal undertakings in the country, and the example set by the municipal tramway undertakings has undoubtedly influenced many other employments.

Despite the cost of these extra payments and expenses, working costs are being kept at a very moderate figure, and we find ourselves in the happy position of being able to provide, on our municipal tramways in Great Britain, what are, I believe, cheaper passenger transport facilities than are to be found elsewhere.

There appears to be growing up amongst the larger towns a keen and, I believe, a healthy rivalry as to which town shall give the cheapest rides, and in England, at any rate, the tendency appears to be to gradually increase the length of the penny stage to distances which a few years back were thought impossible, and in those towns where this policy has been pursued for some length of time it can be said with certainty that, so far as financial results are concerned, and also in what is of more importance, so far as the interests of the municipality as a whole are concerned, the policy is sound.

The distance of the penny stage is playing a more important part in the development of municipal areas than many people, including those who are closely connected with municipal work, have any idea of, and

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I venture the opinion that it is one of the most valuable assets of all large towns to be able to transport their passengers a distance of three miles from the centre for a penny, and that very wide benefits are and will be derived from a policy of this description.

It certainly cannot be said of the tramways, as has been said of the railways since the publication of the 1912 railway report, that their development is at a standstill. In 1912 it is stated that the whole of the railways of this country only added 24 miles to their tracks, and, further, that in 1912 they carried nearly 32,000,000 fewer passengers than in the previous year, which is stated to be one of the most extraordinary facts ever recorded in British industrial development.

Compared with the tramway figures, where the passengers carried for the 12 months dealt with in the last Board of Trade return show an increase of 220,000,000 tramway passengers on the previous year, the figures are very significant.

The cause of the railway decline in the best years of trade which have ever been known is, I should say, the result of their policy of increasing fares together with the tramway, motor car, and motor 'bus facilities, now so largely made use of, and it is safe to assume that this competition will go on and be more keenly felt year by year. For some reason or other the electrification of English railways makes little progress, or we should probably have cause to take a closer interest in their suburban traffic than we do at the present time.

In some respects, for a number of our important tramway undertakings, 1912-13 has proved a year which will be remembered for a long time as an important one in the history of their undertaking, and all our tramways have been concerned, to a certain extent at least, in these matters.

The decision of Parliament on the London County Council (Tramways and Improvements) Bill, 1913, and the reversal of the Parliamentary Committee's decision in regard to compulsory running powers—a very unusual procedure — was a notable victory for the County Council, and may be useful to many of us on future occasions.

The decision of the Lords of Appeal on the rating of tramways was a disappointment, and means a reversion to the previous heavy charge that was made upon us each year for the rating of our systems. To the Sheffield tramways the decision meant an extra charge of £4,200 per annum, we having taken advantage of the decision of the Court of Appeal and obtained a reduction in our rates from that time.

The report of the Select Committee on Motor Traffic, which was awaited with much interest in the tramway and motor 'bus world, has been duly published, and appears to assist in many ways the demand for equality of treatment for which we, as tramway owners and operators, are now asking, and, I believe, intend to persist in asking for until some alteration is made.

Mr. A. R. Fearnley.

It appears clear from the report that if this traffic had been under municipal control the necessity for the Select Committee's appointment would, I venture to say, never have arisen. In other words, as Sir Lawrence Gomme indicated, the serious difficulties have arisen from the results of competition rather than organisation. It would not have been putting the case too strongly to have said—in many cases the result of senseless competition.

The answer of the Chief Commissioner of the Metropolitan Police to the question as to whether he would be in favour of power to divert traffic from one route to another, or to regulate the routes of motor omnibuses, being laid upon some authority, was very significant. The Chief Commissioner intimates by his answer that this is really a municipal duty, and could be best carried out by some such authority. The lesson to all provincial municipalities is clear—whether the street traction be tramways, 'buses, or trolley vehicles—they must do the work themselves, and thus ensure a service which they can control in every way. The essentials on which the committee agree are definitely stated. Summarised, they mean control by a Government department in consultation with local authorities.

Whatever the opinion may be regarding Board of Trade supervision, I believe municipal tramway operators will agree with me when I say that for the last few years, at any rate, the Board has adopted a broad and wise policy in connection with its tramway work, and has consulted and discussed with the representative associations alterations and innovations which have been necessary, and that the result of this method has been of advantage to everybody concerned. Having dealt somewhat briefly with what might be termed the current topics of the traction world, I should like us to consider the immediate outlook which as tramway operators is of paramount importance to us at the present time.

Electric tramways, in the accepted order of things should have, by this time, got through about half their life, that is, taking the life of their predecessors—the horse tramways and the steam tramways as guides—and many people appear to have made up their minds already that electric street traction is going to have no longer life than either the horse or steam tramway systems enjoyed. If the motor enthusiasts are any guide, electric tramways are going to have a somewhat shorter life than either of their predecessors. If some sections of the daily and weekly press are to be believed, the day of trams is already over and has been so announced in heavy type. Our conclusions on this matter will no doubt be assisted and guided by the paper which Mr. Hamilton is to contribute, and the discussion which is to take place at our Conference proceedings to-morrow. It is quite clear that whatever the results of present developments may be, the leading municipalities, at any rate, intend still to control the systems of traction, and it remains for us to see that our sinking funds are in such a healthy condition that we are in a position to take advantage of any change that may be found to be advisable. The 30-year loan periods which were granted when powers were obtained in the early days to construct our tramways may not after all turn out to be the advantage which at that time we considered them, seeing that in many cases all the available balances are used for other than tramway purposes.

During the past session in Parliament a considerable number of municipal authorities have obtained powers to work motor traffic, and my remarks on this subject are chiefly referring to the motor 'bus. The leading exponents of the trackless trolley system of traction are however, with us to-day, and examples of different types of vehicles are, by the kindness of our friends the tramways committees and general managers of Bradford and Rotherham, to be seen working on a short length of our tramway route, and will, I trust, be inspected by all our visitors. This innovation has enabled us to place at your disposal all the three modern systems of passenger transport, and the thanks of the Association are due to our neighbours for their valued assistance.

I recognise that the question of the motor 'bus is the one that is, next to our own business, looming largest in the minds of most tramway operators in the country, whether municipally or company controlled. No excuse is, therefore, needed for making this question one of the important matters for consideration at our Conference. It is a question of many phases. To some members it is a question of unfair competition with the tramways, and perhaps for the moment only, that is the most serious phase of it, and I trust the consideration which our business meeting is to give to the matter on Friday morning will be of some service to our friends.

There will, I am sure, be unanimity in accepting and supporting the resolution put forward by the Croydon and other borough councils in the Metropolitan area on this matter and which reads as follows:

"With reference to the motor omnibus traffic in the borough, the Committee recommend that the Government be urged to pass such

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legislation as will place motor omnibus companies on terms of equality with regard to public obligations with the municipal tramways authorities in the Metropolitan area, and that a communication be addressed to the Prime Minister, the President of the Board of Trade, and the Member for the Borough, on the subject."

To a number of municipalities it is either a question of extension of their tramways or substitution by the motor vehicle or trolley car, and this is undoubtedly the most interesting problem for the provinces. In this case it may be simply a question of the type of vehicle.

Then there is the all-important question of THE ROAD, its construction and maintenance. And further, and probably the most important, the question of tramway renewals where it has to be decided whether the tramway shall be relaid or motor or trolley 'bus substituted, it being remembered that our present renewals are intended to serve us for the next 12 to 15 years.

If I summarised my personal views on this matter I would say:

That there are good types of motor and trolley vehicles to be obtained, the carriage portion of which, however, is somewhat crude and ugly, and follows much too closely upon the lines of the old horse 'bus, and provides very limited accommodation when compared with that to which tramway passengers are now accustomed.

That there are very few roads in the provinces which are really suitable yet for such a vehicle, and that it is now more a problem of the road than the vehicle, and our friends the surveyors who have charge of the streets and highways are undoubtedly going to have their turn in the limelight.

On the other hand, there is a large mileage of tramway permanent way which requires, or will shortly require, renewal. Here, then, is an opportunity for some authority to make an interesting and valuable experiment by taking an existing tramway route, the traffic results of which are well known, and deciding that the tramway service on this route should at least experimentally, if not permanently, be withdrawn and a suitable road surface be laid down and motor 'buses or trolley vehicles substituted for the cars.

There would be some advantages to the residents in the district selected, such as:

A quiet running vehicle;

The entire absence of the tramway rail;

The probability of a more frequent service, but with less saloon or covered accommodation;

The opportunity for the road authority to provide an ideal surface for modern forms of traffic.

If the motor or trolley vehicle is anything approaching in its completeness, reliability, and capacity the claims put forward by its advocates, what hesitation need there be in adopting such a course? It is quite true, and I presume has been remembered by its advocates, that it would cut down the available comfortable accommodation for over six months in the year to one third the present accommodation if a similar service and a similar number of vehicles as is already provided by the tramways was substituted. The total working expenses should certainly not be more than total tramway costs, which figure, however, would not include any allowance for road maintenance over and above the petrol tax of 1½d. per gallon, so that if the routes are outside the city or borough boundaries, this figure would need adding on, at any rate, until the question of contribution to road maintenance is finally settled. There is no difficulty in obtaining contracts for tyre maintenance from first-class firms at one penny (or less) per 'bus mile, and instead of motor spirit being more expensive, as was anticipated would be the case some little time ago, the present indications are that before very long there will be a drop in price, so that 'buses may be worked at an even lower figure than they are to-day, and so far as electrically-propelled vehicles are concerned electric power promises to have the same tendency.

We must try and keep an open mind when considering this question. Some of us are able to compare the present modern and efficient electric tramcar (without attempting to belittle the efforts of the people who were then engaged on the pioneer work of electric traction) with the experimental cars that we saw struggling up the incline in Cheapside, Bradford, some 23 years ago.

Although, so far as I can see at present, there is little likelihood of the motor 'bus taking the place of the tramcar for heavy traffic, it must be remembered that great improvements are likely to be made in the efficiency of the present vehicles. I do not suppose for a moment that we shall continue very long using a gallon of petrol per 7½ miles' run, and if this figure could be increased so that it compared in a reasonable way with the cost of electric power per passenger carried, and home produced motor spirit, free of duty obtained, considerable impetus would be given to the adoption of the motor 'bus in the provinces.

I would here say that I cannot understand the hesitation of the London 'bus companies in declining to give publicity to the details of their working expenses, and it will be of great advantage to us all when reliable figures are published in detail under the standard form of tramway accounts, as I anticipate they will be early next year by quite a number of our municipal tramway departments.

Whether the method suggested for dealing with the subject is adopted or not, I believe that it is most advisable for all our tramway systems to make some experiments with the 'bus, and if the Sheffield experience is any criterion there need be no hesitation in doing this, even if the 'buses are used only as feeders to the tramways, as it is found that such an arrangement works out very satisfactorily, and the experience is useful in every way.

The Sheffield Tramways Committee ordered ten 'buses and we have been working regular services since the beginning of February last. The 'buses are at work on four routes, and a fifth route is to be opened next month. The vehicles have proved reliable in service, and have now run over 100,000 miles. In two instances they have been taken out into the country districts, three miles from our tramway routes, and in both these cases the traffic has been very heavy, especially on fine days and during week ends. If reasonable use can be made of the vehicles during the winter months there is no doubt that next summer we shall require a much larger number of 'buses, and that we shall have need to go still further afield in order to meet the requirements of our passengers. If any members of the Conference or any municipality require information on the working of these vehicles, I am quite sure my committee will in a very short time be willing to place all the available information at their disposal.

Of course, before adopting such a change, trackless trolley cars—which one supercilious person describes as those crosses between tramcars and motor omnibuses which retain none of the best points of either parent—must have the serious consideration which they undoubtedly deserve, and there is now ample reliable experience and data to be obtained on the working of the trackless trolley system.

In our Conference arrangements it will be noticed that this year we have been able to reverse the usual procedure, owing to our success in obtaining two committee representatives in Mr. Councillor Fenton and Mr. Alderman Flint to read papers at our Conference, and these gentlemen, along with Mr. Hamilton, have selected subjects which are being keenly discussed in the tramway world, and their opinions and discussions will, I am sure, prove of assistance to us in our work.

Also we have with us some gentlemen who have had the opportunity of travelling and examining tramway systems abroad since our last meeting, and I trust we shall have the advantage of hearing their views on the subjects raised by the papers.

We have also with us more than the usual number of visitors, whom we are delighted to see, and we shall be intensely pleased if these gentlemen will honour the Conference with their views on the matters that are to be discussed.

It now only remains for me to support the welcome which has been given to you by the Lord Mayor and the Chairman of our Tramways Committee, and to express the hope that we shall have a successful Conference and that our deliberations will be of interest and useful both to the delegates and municipalities they represent.

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Councillor J. H. ROGERS (chairman, Newcastle Tramways Committee): My Lord Mayor,—In the first place, I should like to congratulate you, sir, on having such a successful Conference in your city of Sheffield this year. Of course, under the presidency of Mr. Fearnley, one could not expect any other than that the tramway world throughout the country would rally round him, and give him an exceedingly good Conference in Sheffield, where we all look for our lead on tramway matters. I have risen, my Lord Mayor, to move a vote of thanks to Mr. Fearnley for his excellent address this morning. (Hear, hear.) If that address had been open for discussion, one might have said a lot of things—(laughter)—and got a lot of information; but it is a lead to tramway undertakings throughout the country. This *resumé* of the questions that are before the tramway world at the present time is opportune and excellent. We must not stand still; we must keep alive and progress with the times. Whether progression is by adopting trackless trolleys, motor 'buses, or any other motor power that comes out, I think we ought to keep awake to developments, and our President has tried to emphasise that fact in bringing these matters before us to-day. I also like the idea of impressing upon members present the need of looking after their sinking fund and reserve fund, and the life of the lines and so on. It is always well to keep that in front of every municipality. Now, we have some very interesting papers, and the questions Mr. Fearnley, our president, has introduced in his speech we will probably have the satisfaction of talking to some other experts about—Mr. Flint and Mr. Hamilton especially. Therefore, there is no need to enlarge upon what has been said by Mr. Fearnley, but I do with the utmost heartiness propose that the best thanks of this Conference be given to Mr. Fearnley for his able and excellent address. (Applause.)

Mr. J. ALDWORTH (general manager, Nottingham Corporation Tramways): I rise with very much pleasure to second the vote of thanks proposed by Mr. Rodgers. I am sure all he has said in reference to Mr. Fearnley's presidential address was well deserved. It is an address we cannot appreciate thoroughly in reading it through this morning; we have to take it home and consider it at our leisure, and I am sure we shall appreciate it far more when we have time to consider it more. (Hear, hear.) I have much pleasure in seconding the vote of thanks.

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The vote was carried by acclamation.

The PRESIDENT: I am exceedingly obliged to you for the very kind way in which you have received my remarks, and the vote of thanks which has now been passed. As you are aware, we have quite a good programme and a lot of business to get through. I propose now to commence our real business by calling upon Mr. Alderman Flint to read his paper.

---

Alderman S. FLINT (chairman, Leicester Corporation Tramways Committee): Mr. President and gentlemen,—Before reading this paper I should like to admit at once that my apologies are due to the Conference on many grounds, but I may be permitted perhaps to say that after the paper was written a new name was suggested, in order that an opportunity might be given to the Conference for an adequate discussion on the pay-as-you-enter system. That involved a little chopping and changing, and may account in some degree for the imperfections of the paper.

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# ADVANTAGES AND DISADVANTAGES OF PLATFORM FARE COLLECTION.

BY ALDERMAN S. FLINT

*(Chairman, Leicester Corporation Tramways Committee).*

The Leicester Corporation Tramways, having a central terminus in the very heart of the town, specially adapts itself to a simple system of fares, viz., a universal penny fare from the centre of the town to the various termini.

### FARE BOX SYSTEM.

When the undertaking was acquired from the Leicester Tramway Company in 1902 fares were collected in fare boxes, the number of passengers being marked on what was known as a public way-bill by the conductor. These boxes were taken every journey to a central cash office, opened by a clerk, and the amount of cash entered on a way-bill and subsequently checked at the general office. It was obvious that this was a very unsatisfactory method, as the inspector, when checking the car, had no opportunity of ascertaining whether the fares had been placed in the box or not, and the conductor had no opportunity of challenging the amount of cash which was in his box if subsequently alleged to have been short on any particular trip. Further, in view of the immediate installation of an electric system, it was again obvious that with a quick electric service, conductors could not leave their cars each trip to pay their money in at the office; so it was decided to institute what is known as the bell-punch system, which is practically the system in vogue on all tramways at the present time and needs no description. It was commenced by the Leicester Corporation Tramways on July 23rd, 1903.

### BELL-PUNCH SYSTEM.

With the commencement of the electric system the collection of fares was a very simple matter, as practically only one kind of ticket was in use, viz., a universal 1d. ticket. On through cars a 2d. through ticket was issued if required, but the quantity was infinitesimal.

### OVERLAPPING TICKETS.

The first innovation was the institution of overlapping tickets. These tickets were issued on through cars only, to enable passengers to ride across the centre of the town on the inner portions of two sections for the 1d. fare.

### DISCOUNT TICKETS.

At the beginning of 1911, as a further concession to the public, it was decided to issue tickets in books of 13 for 1s., and to prevent fraud on the part of conductors purchasing such tickets, a specially coloured receipt ticket (green) is given in exchange for a discount ticket, so that a passenger paying cash would receive a white ticket, whilst a passenger paying by discount ticket would receive a green ticket.

All prepaid tickets received by the conductor are put into a paper bag and returned to the office with the unsold tickets, and the total should balance with the number of green tickets issued for prepaid tickets sold.

### TRANSFER TICKETS.

In August, 1911, it was decided to institute a system of transfer tickets, whereby passengers who wished to cross the town from a short distance on any side of the centre, where there were no through cars running, could do so by asking for a transfer ticket, the method being as follows:

Passengers getting on the cars in the transfer stage ask for a transfer ticket and receive a special ticket punched in the stage on which it is issued.

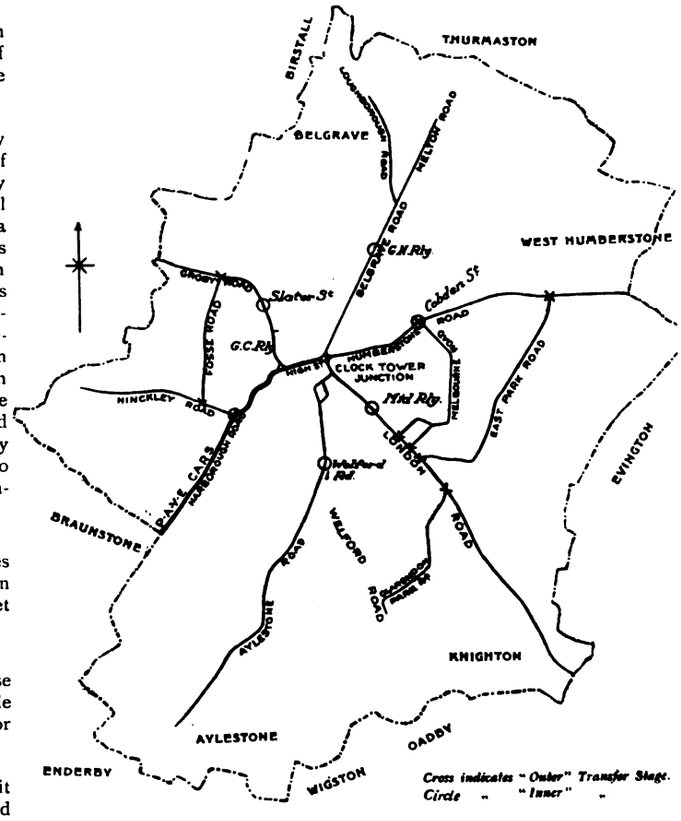
Transfer tickets are practically the same as ordinary tickets, with the addition of a key letter, which is changed every day. This prevents passengers using old transfer tickets. When a discount ticket is tendered for a transfer ticket, a different coloured ticket is issued by the conductor. These tickets are handed to the conductors of the cars transferred to, who issue a special receipt ticket in lieu thereof, and when balancing up with a day's takings only transfer tickets are accepted against these tickets.

Later on the system of transfer tickets was extended to outer districts, enabling passengers who do not wish to come into the town to transfer to a car running to another outer district at a point midway between the central and outer termini. The outer transfer stages are printed on one half of the ticket and the inner stages on the other half. The section punched by first conductor indicates whether the ticket has been issued for an inner or outer transfer stage, and also prevents passengers riding on one outer and one inner transfer stage.

**LIST OF TRANSFER STAGES—FARE 1d.**

OUTER.

| Miles. | To and From. | Transfer Stages. |
|---|---|---|
| 3·28 | Stoneygate terminus and St. Barnabas Church .. | Via Evington Road. |
| 2·91 | Clarendon Park terminus and St. Barnabas Church | Via Evington Road. |
| 2·43 | Stoneygate terminus and Clarendon Pk. terminus. | Via Victoria Park Road. |
| 2·97 | Stoneygate terminus and Nedham Street .. .. Return | Via Saxe-Coburg Street, Via Highfield Street. |
| 2·59 | Clarendon Park terminus and Nedham Street .. Return | Via Saxe-Coburg Street. Via Highfield Street. |




*(P-A-Y-E Cars run on Narborough Road and High Street to Clock Tower Junction).*

**Outline Map of Leicester Tramways.**

| | | |
|---|---|---|
| 2·03 | Narboro' Road terminus and Fosse Road Corner (Groby Road) .. .. | Via Narboro' Road Junction. |
| 2·02 | Narboro' Road terminus and Western Park .. | Via Narboro' Road Junction. |
| 1·74 | Western Park terminus and Fosse Road Corner (Groby Road) .. .. | Via Fosse Road Junction (Hinckley Road). |
| 2·12 | Humberstone terminus and Evington Road (London Road) .. .. .. | Via St. Barnabas Junction. |
| 2·18 | Humberstone terminus and Melbourne Hall.. .. | Via Nedham Street. |
| 1·64 | St. Barnabas Church and Melbourne Hall.. .. | Via Nedham St or Saxe-Coburg St. |
| 1·61 | Groby Road terminus and Narboro' Road Junction | Via Fosse Rd. Junction (Groby Rd.) |

Average distance per 1d. fare, 2·29 miles.

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INNER.

| Miles. | To and From. | Transfer Stages. |
|---|---|---|
| ·736 | Great Northern Station, Belgrave Road .. | Clock Tower. |
| ·793 | Slater Street .. .. .. .. .. | Clock Tower. |
| ·484 | Midland Railway Station, London Road .. | Clock Tower. |
| ·696 | Cobden Street .. .. .. .. .. | Clock Tower. |
| ·652 | Welford Road Junction .. .. .. .. | Clock Tower. |
| ·800 | Narboro' Road Junction .. .. .. .. | Clock Tower. |

Average distance per 1d. fare, 1·387 miles.

These stages are shown on the map attached.

### RETURN TICKETS.

On March 18, 1912, return tickets at single rates were issued on all cars up to and including 7-30 a.m. on week-days, enabling passengers to return with the same ticket on the same day any time after 2-0 p.m. week-days and 12 noon Saturdays. These tickets have a key letter (the same as the transfer tickets), which prevents the use of old tickets, and are issued for cash only, discount tickets not being accepted. A special receipt ticket is given by the conductor for the return journey.

### RETURN TRANSFER TICKETS.

Return transfer tickets are also issued at a single rate. These tickets enable passengers to ride on four sections for 1d., and are used in the same way as transfer tickets, and under the same conditions as to time.

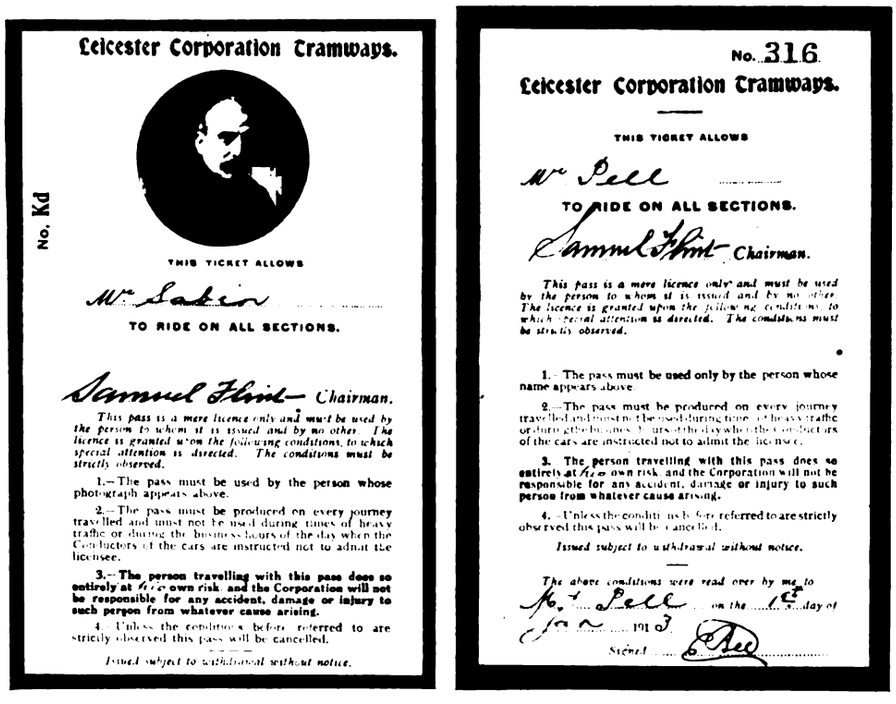
### CHILDREN'S FARES.

Children's fares at half-price (½d.) were instituted on September 9, 1912. These tickets are exactly similar to the ordinary white 1d. tickets with the exception of the colour, which is yellow with a red overprint, and are issued to children over six and under 14 years of age. Discount tickets are not accepted for children's fares.

Transfer tickets are also issued to children at half-price

### PASSES FOR BLIND AND CRIPPLED PERSONS.

Poor blind and crippled persons residing in the borough are carried free of charge, but the Corporation accept no liability for third party accidents, an indemnity being given by the local philanthropic societies against third party risks. One hundred and three passes have been




Specimen Passes for Blind and Crippled Persons.

issued to the blind and 98 to the crippled. Passes to the crippled are limited to 100. Above are facsimiles of passes issued.

It might have been feared that all these concessions would tend to diminish receipts, but such has not been the result. On the contrary, our receipts have steadily increased each year.

During the week ended Saturday, May 31, tickets were sold as follow:

ISSUED FOR CASH.

| | |
|---|---|
| 1d. white tickets .. .. .. .. .. | 586,481 |
| 1d. return ,, .. .. .. .. .. | 36,513 |
| 1d. ordinary transfer tickets .. .. .. | 37,470 |
| 1d. return ,, ,, .. .. .. | 3,905 |
| ½d. children's tickets .. .. .. .. | 62,533 |
| ½d. children's transfer tickets .. .. .. | 5,037 |

ISSUED FOR TICKETS.

| | |
|---|---|
| 1d. green tickets .. .. .. .. .. | 32,796 |
| 1d. discount transfer tickets .. .. .. | 1,258 |
| Exchange tickets issued for transfer and return | 74,827 |
| | 840,880 |

### PAY-AS-YOU-ENTER CARS.

With the increase of traffic the work of the conductor has become very onerous, and it has become quite a problem as to how he shall get all his fares at rush hours, especially where the distance is very short, say to one of the principal stations where a conductor has perhaps to get 40 or 50 fares in a few minutes. To meet this difficulty it was decided at the beginning of the year to give a trial to the P-A-Y-E system of collection of fares in which the fares are collected as passengers enter the car. This system has been in vogue for the past six months on one of the sections (marked on the map), and has proved very satisfactory.

On the P-A-Y-E cars the platform is divided into two gangways by means of a rail, behind which the conductor stands and collects the fares as the passengers board the car. Passengers on paying their fares receive a ticket the colour of which denotes the stage to which they are entitled to travel, and on leaving the car the ticket is deposited in a sealed box fixed on the platform, specially designed for this system, which enables the motorman or conductor to detect by the colour of the ticket whether a passenger is over-riding. Transfer and workmen's tickets are issued on these cars, but passengers are not required to deposit these tickets but to show them on leaving the car.

Pay-as-you enter tickets are numbered in the usual way and booked on the way-bill, but are not punched, as if a conductor issues an old ticket he would be detected at once by the number if an inspector boarded the car. Samples of tickets and way-bills are shown at the end of paper. The contents of the deposit boxes are checked each evening and balanced against the tickets issued by the conductor. Particulars of instructions issued to conductors are appended.

In considering the experimental adoption of the pay-as-you-enter system, consideration was given to the advantage of minimising the risk of accidents caused through passengers attempting to board and alight from cars whilst in motion. During the year ended December 31, 1912, at Leicester, 449 persons received injuries through attempting to board or alight from cars whilst in motion. Our experience with pay-as-you-enter cars proves that accidents of this description are practically *nil*.

The conductor, always being on the platform of the car, is enabled to prevent people from risking this foolish practice. On the old system, where his duties take him inside and on the top of the car to collect fares whilst the car is on its journey, he has not the same opportunity of guarding the safety of the passengers.

It also does away with the irritation and discomfort to passengers caused by conductors having to push their way through crowded cars to collect the fares, especially in wet and inclement weather. Another advantage is that the conductor, always being on the platform, is less likely to leave intending passengers behind.

We find that the cars run well to time, and there is no more trouble or time lost in loading these cars than the ordinary ones. Of course very much depends upon the co-operation of the public, but our experience has been that passengers soon adapt themselves to the new system and have their fares ready.

The motormen and conductors working these cars are very much in favour of this system, the conductors because they can do their work more efficiently and without the excessive strain of constantly going up and down stairs to collect fares, and at the same time keep a proper look-out for intending passengers; the motorman because he can give the whole of his attention to his own end of the car, and knowing that the conductor is always on the back platform, it is not necessary for him to strain his neck in endeavouring to make quite sure the back platform is clear before starting the car.

With regard to the financial aspect of the pay-as-you-enter cars I regret at the present I am unable to furnish any complete comparisons. The route selected for the experimental trial of this system (Narboro' Road) was previously a through route and was chosen chiefly because it was a short distance and thickly populated. The passengers are

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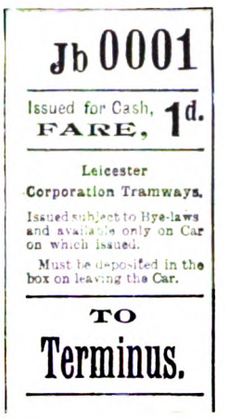
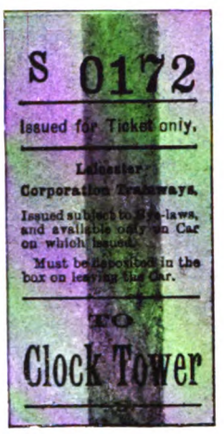
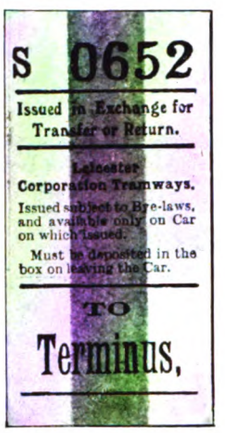


S 0363
Issued for Cash or Ticket
Child's Ticket 1d.
FARE, 2
Leicester
Corporation Tramways.
Issued subject to Bye-laws, and available only on Car on which issued.
Must be deposited in the box on leaving the Car.
TO
Clock Tower.

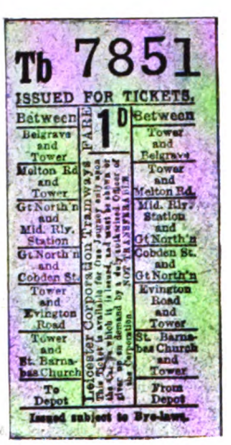
S 0322
Issued for Ticket only.
Leicester
Corporation Tramways.
Issued subject to Bye-laws and available only on Car on which issued.
Must be deposited in the box on leaving the Car.
TO
Terminus.

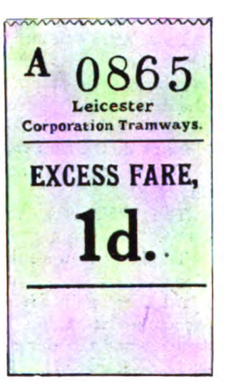

S 0172
Issued for Ticket only.
Leicester
Corporation Tramways.
Issued subject to Bye-laws, and available only on Car on which issued.
Must be deposited in the box on leaving the Car.
TO
Clock Tower


S 0652
Issued in Exchange for Transfer or Return.
Leicester
Corporation Tramways.
Issued subject to Bye-laws, and available only on Car on which issued.
Must be deposited in the box on leaving the Car.
TO
Terminus.

S 0597
Issued in exchange for Transfer or Return.
Leicester
Corporation Tramways.
Issued subject to Bye-laws, and available only on Car on which issued.
Must be deposited in the box on leaving the Car.
AVAILABLE TO
CLOCK TOWER
(Inward Journey)
Inner Transfer Stage
(Outward Journey)

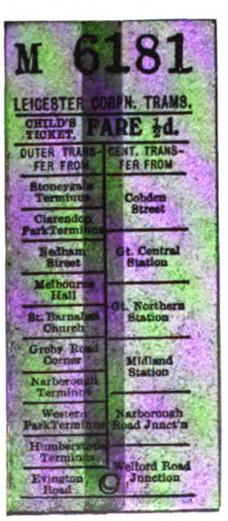
Samples of Pay-As-You-Enter Tickets.

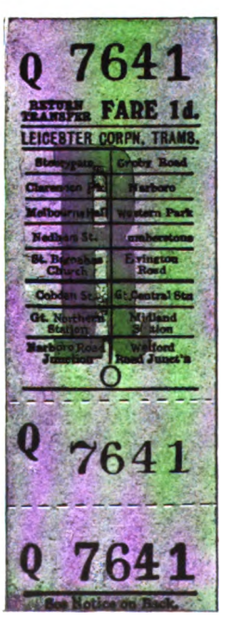



P-A-Y-E Ticket.

[NOTE: Besides the 1d. Excess Fare Ticket there is also one for ½d.]




Tickets in use on Leicester Corporation Tramways.

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restricted to the district, and overlapping passengers, who are very numerous, due to the principal railway station being at the end of the overlapping stage, have been diverted to another section.

The receipts for 12 weeks ending July 5, on pay-as-you-enter cars amounted to £2,798—passengers 703,134; corresponding period of 1912 the receipts were £2,827—passengers 681,5778, or a decrease of £29 in receipts, the increase in passengers being accounted for by the recent introduction of halfpenny children's fares. The Western Park route, however, which has been altered to the through route, shows receipts for same period 1913 of £2,176 against £1,444 for corresponding period of last year, or an increase of £732, due in a great degree to the overlap and through riding. Taking this into consideration there has undoubtedly been a considerable increase in the sectional receipts, quite equal to, and I think in excess of, the average over the whole system.

A number of deputations from other towns have visited Leicester to see the pay-as-you-enter system at work, and amongst other questions, I have been frequently asked my opinion as to whether the system would be workable in towns where the fares are varied and complicated. I can only say that we have to deal with a complicated ticket system, as you will see by reference to the explanation of the working of the Leicester system, comprising discount tickets, transfer tickets, workmen's return tickets, children's tickets, etc., etc., and I think that there would be very little difficulty in adapting this system to meet any requirements.

My attention has also been called to an experiment being tried at Sheffield, where, as far as possible, the fares of passengers using the upper deck are collected on the platforms. Well, if it is better to collect the fares of the upper deck passengers on the platform it seems to me it must be better to collect from the inside passengers also. Moreover, there must be extreme difficulty in carrying out this system efficiently, especially at rush hours, and when cars are crowded on wet days, etc., and I should say a conductor would be more likely to miss fares where there is no defined method.

Naturally we have had a certain amount of public criticism in introducing a new system, this was only to be expected.

The chief complaints were:

Passengers on upper deck had to leave their seats some distance before reaching their stopping point to notify the driver.

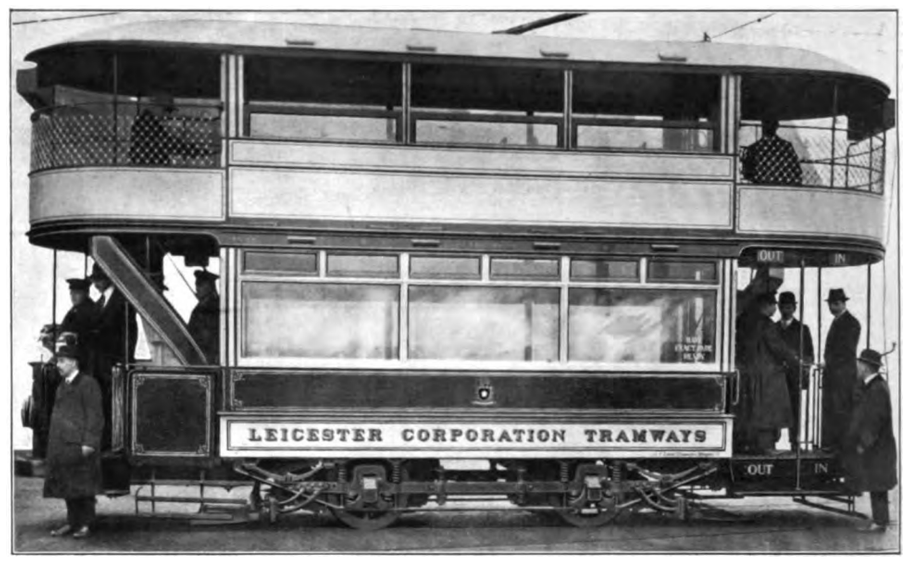
Continual opening of doors on upper deck made the cars very draughty.

There was no accommodation for luggage.

The staircases were narrow and steep.

The last two were the principal objections.

All these points have now been met. Accommodation has been provided for luggage and the design of the staircases is being improved. The first objections were overcome by allowing passengers *en route* to leave the car by either staircase. At the present time I do not think there is anything to which any reasonable person could raise objection.




**Leicester Corporation Pay-As-You-Enter Car.**

### TICKET BOXES FOR WASTE TICKETS.

In the interests of cleanliness and tidiness of the streets and cars, waste ticket boxes are placed on each platform, and a notice is displayed requesting passengers to deposit their tickets in the box when leaving the car.

### GENERAL REMARKS.

By a reference to the sample way-bill it will be noted that tickets issued for cash are practically duplicates of the tickets issued for prepaid tickets or tokens.

This system prevents fraud on the part of the conductor, only cash being accepted for cash tickets sold, and tickets for prepaid tickets sold.

If only one kind of ticket was issued it would be possible for the conductor to purchase discount tickets and pay them in instead of cash, thereby making 1d out of every 13 tickets purchased.

---

## LEICESTER CORPORATION TRAMWAYS.

STATISTICAL INFORMATION for the year ended December 31, 1912:

| | |
|---|---|
| Population served by tramways (estimated) | 229,296 |
| Traffic revenue .. .. .. .. | £134.966 6 0 |
| Total revenue .. .. .. .. .. | £147.671 7 9 |
| Car miles .. .. .. .. .. | 3,663,215 |
| Passengers carried .. .. .. .. | 32,907,795 |
| Average traffic revenue per car-mile .. | 8.843d. |
| Average traffic revenue per mile of single track .. .. .. .. .. | £3.647 14 9 |
| Average total revenue per car-mile .. | 9·675d. |
| Average working expenses per car-mile including power cost .. .. .. | 6·226d. |
| Average distance per 1d. fare .. .. | 2·18 miles |
| Average fare paid per passenger .. .. | ·984d. |
| Average number of passengers per car-mile | 8·983 |
| Average journeys per head of population per annum .. .. .. .. | 143 |
| Number of cars in stock .. .. .. | 150 |
| Total amount of sinking fund .. .. | £129,210 16 8 |
| Amount of reserve or renewals fund .. | £100,000 |

SUMMARY OF PASSENGERS CARRIED AND RECEIPTS.

Appended is a list of passengers and receipts since the inauguration of the electric system:

| Financial Year. | Year ended. | No. of Cars. | Miles run. | Passengers carried. | Receipts. |
|---|---|---|---|---|---|
| | May 18 to | | | | £ s. d. |
| 1904 | December 31 | 99 | 1,229,507 | 12,039,252 | 50,163 11 0 |
| 1905 | December 31 | 140 | 3,342,248 | 25,890,030 | 108,111 2 11 |
| 1906 | December 31 | 140 | 3,331,998 | 27,467,984 | 114,752 7 0 |
| 1907 | December 31 | 140 | 3,334,924 | 27,417,227 | 114,667 19 4 |
| 1908 | December 31 | 140 | 3,334,136 | 27,411,286 | 114,689 5 1 |
| 1909 | December 31 | 140 | 3,433,860 | 27,510,386 | 114 901 2 8 |
| 1910 | December 31 | 140 | 3,546,724 | 29,370,699 | 122,693 6 11 |
| 1911 | December 31 | 140 | 3,653,949 | 31,314,360 | 130,384 1 3 |
| 1912 | December 31 | 140 | 3,663,215 | 32,907,795 | 134,966 6 0 |

### INSTRUCTIONS TO CONDUCTORS ON P-A-Y-E CARS.

The following are the instructions issued to the conductors on the pay-as-you-enter cars:

This system of issuing tickets is called the colour zone fare system.

From Clock Tower to Narborough Road Junction is the red zone.

From Narborough Road Junction to the terminus is the white zone.

Thus all passengers travelling from Clock Tower beyond Narborough Road Junction must deposit a white ticket on alighting from the car.

From terminus to Clock Tower a red ticket must be deposited.

N.B.—From Clock Tower to Narborough Road Junction, on the outward journey only, either red or white. This does not refer to passengers purchasing on the car transfer or return tickets, who simply show them when leaving the car.

Ticket No. *Narborough Road Section.—Tower to Terminus.*

1.—Return brown to be issued to all cash passengers up to 7-30 a.m Ticket No. 1 to be retained by passenger when leaving car.

2.—White to all cash passengers from 7-30 a.m. to finish.

3.—White horizontal purple stripe to all children over six and under 14 years of age, either for cash or prepaid ticket at all times

4.—White perpendicular brown stripe to all passengers with prepaid tickets or tokens at all times.

5.—White perpendicular green stripe to be given in exchange for transfer from Narborough Road Junction to terminus, or return ticket, Tower to terminus at all times.

*(Continued on page 315.)*

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## LEICESTER CORPORATION TRAMWAYS. Conductors Way Bill.

The Number of the First Ticket of each Fare must be entered in the Column before the starting of the Car at each Terminus.

**NARBOROUGH ROAD SECTION.** *Conductor's Signature* *No* DAY MONTH *191*

*Cash White* ..... *Children's White* ..... *Discount White* ..... *White Exchange* .....

Time from Nos. at ,, *Red* ..... ,, *Red* ..... ,, *Red* ..... .....

,, *Transfer* ..... ,, *Transfer* ..... ,, *Transfer* ..... *Red Exchange* ..... ....

| Journey | Car No | Time from Tower | Nos. at Tower | Exchange Nos at Narbro Rd Junction | Nos at Narbro Rd Terminus | Transfer Nos at Narbro Rd Terminus | Transfer Nos at Narbro Rd Junction | PASSES | Journey | Car No | Time from Tower | Nos. at Tower | Nos. at Narbro Rd Junction | Nos. at Narbro Rd Terminus | Transfer Nos at Narbro Rd Terminus | Transfer Nos at Narbro Rd Junction | PASSES | INSPECTOR'S CHECK Initials | Time | On Car at |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Cash | | | | | | | | | 6 Cash | | | | | | | | | | | |
| 1 Discount | | | | | | | | | 6 Discount | | | | | | | | | | | |
| 1 Children's | | | | | | | | | 6 Children's | | | | | | | | | | | |
| 1 Exchange | | | | | | | | | 6 Exchange | | | | | | | | | | | |
| 2 Cash | | | | | | | | | 7 Cash | | | | | | | | | | | |
| 2 Discount | | | | | | | | | 7 Discount | | | | | | | | | | | |
| 2 Children's | | | | | | | | | 7 Children's | | | | | | | | | | | |
| 2 Exchange | | | | | | | | | 7 Exchange | | | | | | | | | | | |
| 3 Cash | | | | | | | | | 8 Cash | | | | | | | | | | | |
| 3 Discount | | | | | | | | | 8 Discount | | | | | | | | | | | |
| 3 Children's | | | | | | | | | 8 Children's | | | | | | | | | | | |
| 3 Exchange | | | | | | | | | 8 Exchange | | | | | | | | | | | |
| 4 Cash | | | | | | | | | 9 Cash | | | | | | | | | | | |
| 4 Discount | | | | | | | | | 9 Discount | | | | | | | | | | | |
| 4 Children's | | | | | | | | | 9 Children's | | | | | | | | | | | |
| 4 Exchange | | | | | | | | | 9 Exchange | | | | | | | | | | | |
| 5 Cash | | | | | | | | | 10 Cash | | | | | | | | | | | |
| 5 Discount | | | | | | | | | 10 Discount | | | | | | | | | | | |
| 5 Children's | | | | | | | | | 10 Children's | | | | | | | | | | | |
| 5 Exchange | | | | | | | | | 10 Exchange | | | | | | | | | | | |

*Cash White* ..... *Children's White* ..... *Discount White* ..... *White Exchange* .....

Time to Nos. at ,, *Red* ..... ,, *Red* ..... ,, *Red* .....

,, *Transfer* ..... ,, *Transfer* ..... ,, *Transfer* ..... *Red Exchange* ..... .....

## LEICESTER CORPORATION TRAMWAYS.

### CONDUCTOR'S WAY BILL.

### BELGRAVE and EAST PARK ROAD, via London Road.

The Number of the First Ticket of each Fare must be entered in the Column before the starting of the Car at each Terminus.

*Brown* ..... *Children's* ..... *Green* .....

Time from Depot Nos. at Depot *Return Transfer* ..... ,, *Transfer* ..... *Orange* .....

| Journey. | Car No. | Time from Tower. | Nos. at Tower. | Nos at Belgrave. | Transfer Nos. at G.N.R.S. | Nos. at G.E.R.S. | Nos. at Tower. | TICKETS SOLD | | PASSES | INSPECTOR'S CHECK. Initials. | Time. | On Car at |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Cash | | | | | | | | | | | | | |
| 1 Discount | | | | | | | | | | | | | |
| 1 Children's | | | | | | | | | | | | | |
| 2 Cash | | | | | | | | | | | | | |
| 2 Discount | | | | | | | | | | | | | |
| 2 Children's | | | | | | | | | | | | | |
| 3 Cash | | | | | | | | | | | | | |
| 3 Discount | | | | | | | | | | | | | |
| 3 Children's | | | | | | | | | | | | | |
| 4 Cash | | | | | | | | | | | | | |
| 4 Discount | | | | | | | | | | | | | |
| 4 Children's | | | | | | | | | | | | | |
| 5 Cash | | | | | | | | | | | | | |
| 5 Discount | | | | | | | | | | | | | |
| 5 Children's | | | | | | | | | | | | | |

| Journey. | Car No. | Time from Tower. | Nos at Tower | Nos. at Evington Road | Transfer Nos. at Evington Road | Transfer Nos. at St. Barnabas Ch | Transfer Nos. at Cobden Street | Nos at Nedham Street. | | PASSES | INSPECTOR'S CHECK. Initials. | Time. | On Car at |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Cash | | | | | | | | | | | | | |
| 1 Discount | | | | | | | | | | | | | |
| 1 Children's | | | | | | | | | | | | | |
| 2 Cash | | | | | | | | | | | | | |
| 2 Discount | | | | | | | | | | | | | |
| 2 Children's | | | | | | | | | | | | | |
| 3 Cash | | | | | | | | | | | | | |
| 3 Discount | | | | | | | | | | | | | |
| 3 Children's | | | | | | | | | | | | | |
| 4 Cash | | | | | | | | | | | | | |
| 4 Discount | | | | | | | | | | | | | |
| 4 Children's | | | | | | | | | | | | | |
| 5 Cash | | | | | | | | | | | | | |
| 5 Discount | | | | | | | | | | | | | |
| 5 Children's | | | | | | | | | | | | | |

*Brown* ..... *Children's* ..... *Green* .....

Nos. at Tower *Return Transfer* ..... *Transfer* ..... *Orange* .....

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## LEICESTER CORPORATION TRAMWAYS.

**NARBOROUGH ROAD.**

### CONDUCTOR'S WAY BILL.

The Number of the First Ticket of each Fare must be entered in the Column before the starting of the Car at each Terminus.

Time from Depot — Nos. at Depot — *Outwards Cash Brown* ..... *Cash Transfer* ..... *Discount White* .....
*Inwards* „ *Brown* ..... „ *Children's Ordinary* ..... „ *Red* .....
*Ordinary* „ ..... *Children's Transfer* .....

| Journey. | | Car No. | Time from Tower. | Nos. at Tower. | Nos. at Narboro' Road Terminus. | Transfer Nos. at Narboro' Road Terminus. | Transfer Nos. at Narboro' Road Junction. | TICKETS SOLD | | | PASSES. | INSPECTOR'S CHECK. Initials. | Time. | On Car at |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 2 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 3 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 4 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 5 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 6 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 7 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |
| 8 | Cash | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | |

Nos. at — *Outwards Cash Brown* ..... *Cash Transfer* ..... *Discount White* .....
*Inwards* „ *Brown* ..... „ *Children's Ordinary* ..... „ *Red* .....
*Ordinary* „ ..... *Children's Transfer* .....

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## LEICESTER CORPORATION TRAMWAYS. Conductor's Way Bill.

The Number of the First Ticket of each Fare must be entered in the Column before the starting of the Car at each Terminus.

**EAST PARK ROAD SECTION, via Humberstone Road.** *Conductor's Signature* — *No.* — DAY — MONTH — *191*

Time from — Nos. at — *White* ..... *Green* ..... *Children's* .....
*Blue* ..... *Orange* ..... *Exchange* .....

| Journey | | Car No. | Time from Tower. | Nos. a Tower | Exchange Nos. at Tower. | Exchange Nos at Nedham Street. | Exchange Nos at S. Barnabas Church | Transfer Nos at S. Barnabas Church | Nos at S. Barnabas Church | Transfer Nos. at M H S | Nos. at M.H.S | Exchange Nos at M.H.S | Nos at Tower. | TICKETS SOLD 1d | TICKETS SOLD ½d. | PASSES. | INSPECTOR'S CHECK. Initials. | Time | On Car at |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |
| 2 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |
| 3 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |
| 4 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |
| 8 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |
| 9 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |
| 10 | Cash | | | | | | | | | | | | | | | | | | |
| | Discount | | | | | | | | | | | | | | | | | | |
| | Children's | | | | | | | | | | | | | | | | | | |

Time to — Nos. at — *White* ..... *Green* ..... *Children's* .....
*Blue* ..... *Orange* ..... *Exchange* .....

(A similar form continues from 11 to 20.)

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**LEICESTER CORPORATION TRAMWAYS.**

**Conductor's Way Bill.** DAY | MONTH 191

Turn No. ..... Route No. ..... Car No. ..... Punch No. .....

**TICKETS TO BE ISSUED FOR CASH ONLY.**

| COLOUR. | TICKETS Letter | TICKETS Quantity | Last Numbers. | First Numbers. | First Numbers Returned to Office. | Quantity Sold. | Remarks by Conductor |
|---|---|---|---|---|---|---|---|
| WHITE. | | | | | | | |
| " | | | | | | | |
| " | | | | | | | |
| RETURN BROWN. | | | | | | | |
| " | | | | | | | |
| ORDINARY TRANSFER. | | | | | | | |
| " | | | | | | | |
| " | | | | | | | |
| RETURN TRANSFER. | | | | | | | |
| " | | | | | | | |
| " | | | | | | | |

**CHILDREN'S TICKETS.** Total at 1d.

| | | | | | | |
|---|---|---|---|---|---|---|
| CHILDREN'S ORDINARY. | | | | | | |
| " | | | | | | |
| CHILDREN'S TRANSFER. | | | | | | |

Total at ½d.

£ s. d. Children's Tickets .....

| Difference in Cash .. | Over. | Under. | Total Sold | Cash Paid in | Received by |
|---|---|---|---|---|---|
| | Filled by | Checked by | | | |
| Punch Register .. | | | | | |
| OVER .. | | | | | |
| UNDER .. | | | TOTAL | | |

**Tickets to be issued for all Prepaid Tickets and Tokens**

| COLOUR. | TICKETS Letter | TICKETS Quantity | Last Numbers. | First Numbers | First Numbers Returned to Office. | Quantity Sold. | |
|---|---|---|---|---|---|---|---|
| GREEN | | | | | | | |
| " | | | | | | | |
| TRANSFER ORANGE. | | | | | | | |
| " | | | | | | | |
| TRANSFER EXCHANGE RETURN | | | | | | | |
| " | | | | | | | |
| " | | | | | | | |

Checks .....
Tokens .....

| Difference in Tickets .. | Over. | Under. | Total Sold. | Total handed in ... |
|---|---|---|---|---|
| | | | | |

The above statement is a correct account of the Tickets handed to me this day

Motorman's Name ..... Conductor's Signature ..... No. .....

**LEICESTER CORPORATION TRAMWAYS.**

**Conductor's Way Bill.** DAY. | MONTH 191

Turn No. ..... Route No. ..... Car No. ..... Punch No. .....

**TICKETS TO BE ISSUED FOR CASH ONLY.**

| COLOUR. | TICKETS Letter | TICKETS Quantity | Last Numbers. | First Numbers. | First Numbers Returned to Office. | Quantity Sold. | Remarks by Conductor |
|---|---|---|---|---|---|---|---|
| Exchange Return Brown. | | | | | | | |
| " | | | | | | | |
| Exchange Return Brown. | | | | | | | |
| " | | | | | | | |
| Ordinary Brown. | | | | | | | |
| RETURN TRANSFER. | | | | | | | |
| " | | | | | | | |
| ORDINARY WHITE. | | | | | | | |
| " | | | | | | | |
| ORDINARY RED | | | | | | | |
| " | | | | | | | |
| ORDINARY TRANSFER. | | | | | | | |
| " | | | | | | | |
| Waste Excess | | | | | | | |

**CHILDREN'S TICKETS.** Total at 1d.

| | | | | | | |
|---|---|---|---|---|---|---|
| Children's Ord'y Waste. | | | | | | |
| " | | | | | | |
| Children's Ord'y Ret. | | | | | | |
| " | | | | | | |
| Children's Ord'y Trans. | | | | | | |
| " | | | | | | |
| Red Excess | | | | | | |

Total at ½d.

£ s. d. Children's Tickets .....

| Difference in Cash | Over. | Under. | Total Sold | Cash Paid in | Received by |
|---|---|---|---|---|---|
| | Filled by | Checked by | | | |
| | | | TOTAL | | |

**Tickets to be issued for all Prepaid Tickets and Tokens**

| COLOUR. | TICKETS Letter | TICKETS Quantity | Last Numbers. | First Numbers | First Numbers Returned to Office | Quantity Sold. | |
|---|---|---|---|---|---|---|---|
| DISCOUNT WHITE. | | | | | | | |
| " | | | | | | | |
| DISCOUNT RED | | | | | | | |
| " | | | | | | | |
| DISCOUNT Orange Trans. WHITE EXCHANGE | | | | | | | |
| " | | | | | | | |
| RED EXCHANGE | | | | | | | |
| " | | | | | | | |

Checks .....
Tokens .....

| Difference in Tickets .. | Over. | Under. | Total Sold. | Total handed in ... |
|---|---|---|---|---|
| | | | | |

The above statement is a correct account of the Tickets handed to me this day

Motorman's Name ..... Conductor's Signature ..... No. .....

*Terminus to Tower.*

6.—Return brown to be issued to all cash passengers up to 7-30 a.m. Ticket No. 6 to be retained by passenger when leaving car.

7.—Red to all cash passengers from 7-30 a.m. to finish.

8.—Red horizontal purple stripe to all children over six and under 14 years of age, either for cash or prepaid tickets, at all times.

9.—Red perpendicular brown stripe to all passengers with prepaid tickets or tokens at all times.

10.—Red perpendicular green stripe to be given in exchange for transfer Tower to Narborough Road Junction or return, terminus to Tower, at all times.

When passengers leave the car, tickets Nos. 1 and 6 will be retained by passenger.

Tickets Nos, 2, 3, 4, 5, 7, 8, 9, and 10 must be deposited in box on car by passenger when leaving.

The above tickets (Nos. 1 to 10) must not be punched.

11.—Blue return transfer to all cash passengers requiring transfers up to 7-30 a.m. both ways. Passengers with return transfer tickets who have the second and third portion of their tickets must give the first part up when boarding the car and show the remaining portion of the ticket at the landing point.

12.—Blue ordinary transfer to all cash passengers requiring transfers after 7-30 a.m. both ways.

13.—Orange discount transfers to all passengers requiring transfers with prepaid tickets or tokens at all times both ways.

14.—Children's transfer: Blue, perpendicular red stripe, to all children over six and under 14 years of age reqniring transfers, either for cash or prepaid ticket, at all times both ways.

The above transfer tickets (11 to 14) must be punched in the section issued when sold, and retained by passenger when leaving car.

All prepaid tickets, transfers, and return brown returned to the office must be punched at the bottom by the conductor.

## DISCUSSION ON ALDERMAN FLINT'S PAPER.

The PRESIDENT: Alderman Flint's excellent and informative paper is now open for discussion by the Conference, and I propose to ask Mr. Councillor Smith, of Aberdeen, who has had some experience in this matter, to open the discussion.

Mr. Councillor J. A. SMITH (chairman, Aberdeen Corporation Tramways Committee): Mr. President,—My first duty is to compliment Alderman Flint on his paper, so full of information on the Leicester fare collection system, and I express my personal thanks for the interesting and most complete explanation he has given of the complicated ticket system of that city. The nature of our official duties teaches everyone here the necessity of getting all our fares, and the difficulties and problems that surround this duty. For this reason, Alderman Flint's experience of the P-A-Y-E system is most valuable, and is likely to be the centre of interest in this discussion. The Corporation of Aberdeen, which I represent here to-day, have also adopted the P-A-Y-E system on one of their routes, and I believe it is because of this fact that I have been asked to open the discussion this morning. If this be so, I am pleased to have the opportunity of acquainting you with our experience. Our P-A-Y-E cars are operated on one distinct route which runs north from its own terminus at Queen's Statue to Woodside, a distance of 2½ miles. Eleven cars are in use on this line, six of which were built new, and five other modern cars had their platforms extended and altered to the P-A-Y-E requirements. They have been running five months, and I am in a position to give you a complete financial comparison with the corresponding five months of last year. Let me say here that the difference between Leicester and Aberdeen P-A-Y-E cars is that in Aberdeen, only top deck passengers leave by the front exit. The lower saloon passengers leave by the exit rear door. On the top deck we have in addition a screen in front of the exit door, so that when passengers leave by the front top deck door there is no draught caused, and no unpleasant effects. Our ticket system also differs from Leicester in this respect, that our conductors use roll tickets, while in Leicester they use the packet tickets. Our fare system is also much less complicated, the fare being 1d. all the way, with five intermediate halfpenny stages, which do not overlap.

When the P-A-Y-E system was introduced five months ago, we feared that the congestion in loading would be too great, and would cause the cars to run late, but in practice we have experienced no difficulty. Passengers have become accustomed to the system, and have their fares ready. Very little change is required. Under the old system we had to exchange 10 silver coins for every 100 passengers, but under the P-A-Y-E system change is required by less than five per cent. of the passengers. Persons requiring change are required at a busy time to stand aside and give preference to persons with copper. In completely loading a P-A-Y-E car it will take generally slightly longer than the ordinary car, but the time saved along the route at each stop, with passengers loading and alighting at the same time, and the fact that the conductor is always ready at the rear end to give a prompt bell, more than makes up for the time lost at the termini. I am in a position to give the exact time taken on the same route on the old system, and the time taken with the new P-A-Y-E cars. On the

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old system the total average time was 35·1 minutes per journey, against 34·2 minutes taken on the P-A-Y-E system, a saving of nearly one minute per journey. With regard to accidents, our experience is almost identical with Leicester. We all know the type of accident which is most frequent, and which often results in serious injuries to passengers; that is from persons boarding or alighting while the car is in motion. This type of accident is practically eliminated, because the conductor is always on the rear platform in a position to prevent these accidents, and not only to prevent but to aid elderly people and young children boarding and alighting. The system which allows the rear platform to take care of itself while the conductor is busy on the top deck or saloon is behind the age, and it is high time it was superseded by a system more thoughtful and humane.

Let me read an extract from a letter from the Chief Constable of Aberdeen, addressed to our general manager. It is dated August 22, 1913, and had no reference to this Conference or the paper under discussion. Mr. Anderson says: "With reference to your inquiry as to the opinion of the police on the 'pay-as-you-enter' cars, I beg to inform you that the opinion is favourable. Personally, I have noticed in particular the advantage to the travelling public of having the conductor always at his post at the rear of the car. As a consequence of this there has, as you know, since the inauguration of the system in April last, not been a single accident to a passenger entering or leaving the cars. The motorman is also free to give his undivided attention to the traffic on the street, there being no need for him to look round to ascertain whether passengers have safely left or entered the car, and there is thus less risk of the car being allowed to collide with any person or vehicle. Altogether the system appears to me to be a decided advance on the old system."

I thoroughly agree with and corroborate Alderman Flint's reference to the relief from physical and nervous strain on motormen and conductors—especially the conductors. The public should not expect the tramway servant to follow them to whatever part of the car they select to sit in, and wait till they leisurely find and open their purses for the necessary fare. The worry of getting all the fares is heavy on some conductors, and it is aggravated by much running up and down stairs. Besides, it is impossible to take up all intending passengers if long absent from the rear platform, and the undertaking consequently suffers from loss of receipts. I consider it is a great relief for a conductor to know that he has received the fare from every passenger aboard his car, and to find his duties thereafter confined to their safe passage through the journey. The advantage is a mutual one both to passengers and tramway servants.

In Aberdeen we have had very little fault-finding, and a great deal of co-operation on the part of the public. Any criticism we have had in Aberdeen is not so much against the system itself as against the width of the staircase. That is a fault easily remedied, and as a matter of fact we have constructed a wider and easier stair for the inspection of the Town Council against the time, now near at hand, when a decision must be made as to the propriety of extending the system to other routes.

Another point I wish to emphasise on this new type of car is the better regulation of passenger traffic. With the divided entrance, you prevent the usual crushing and jostling which takes place at busy times. We have all noticed passengers at stations having to wait a considerable time while those who wish to descend from the top have alighted. Under the P-A-Y-E system the top passengers leave by the front, and at the same time the saloon passengers are leaving by the rear platform, thus avoiding much congestion at the end of the car and saving time.

Now, with regard to the financial aspect of the question, are all the managers here present sure that they receive all their fares? I am not asking them to make admissions in the presence of their chairmen, but the general manager in Aberdeen thinks there is considerable leakage at busy times. This can be said without in any way questioning the diligence and conscientiousness of the conductors, or the honesty of the general public. Owing to the heavy traffic and increasingly cheap fares, the conductor's duties are becoming too numerous for him to execute properly, and some fares remain uncollected. The pay-as-you-enter system, from our five months' experience of it, reduces the conductor's work, and enables him to collect all fares without leaving the rear platform.

The receipts on the route in Aberdeen which is being operated on this new system have risen, for the twenty weeks ending September 17, by £468, an average of £23 8s. 0d. per week over the corresponding twenty weeks of 1912, and although we have in this period increased the mileage run, the rate per car-mile has also increased from 11·3 to 11·7 pence per car-mile. A certain amount of this is due to natural increase in the traffic, but we know also that a considerable part of it is due to the prepayment of fares. This, gentlemen, is our Aberdeen experience, and I hope it will be useful to you, and *apropos* of this discussion. My own opinion is that the system marks a great advance in the efficient working of tramway traffic. (Applause.)

The Mayor of Rochdale (Alderman Wm. Cunliffe): I am under the impression that the Board of Trade, at any rate as far as we are concerned, would prevent any leaving by the front entrance of the car. Is there any such regulation or prohibition by the Board of Trade in reference to that?

The President: If you ask my opinion, I think, if there is, there would be no difficulty in getting it altered.

Councillor F. G. Isherwood, J.P. (deputy mayor and chairman, Oldham Tramways Committee): I think we are all very much indebted to Mr. Alderman Flint for his very valuable paper this morning. (Hear, hear.) Leicester is peculiarly well situated for adopting the system he has referred to. He tells us that from the Square or terminus where all the cars start from, they go to the other terminus for the 1d. Now it is very easy to work the P-A-Y-E system in a case like that, but suppose they had a 3d. stage, and a man paid 1d. as he entered the car, what would become of the other two stages of the journey? I do not know whether I have made that clear to Mr. Flint, but in our town we have a 3d. stage. How would he collect the 3d? Suppose a 1d. were paid as the passenger entered, how would he get the other 2d? The conductor would have to go to the passengers again in the car, in that case, to collect the other 2d. I should like Mr. Flint to explain that in his reply.

Mr. Bailie Alston (vice-convener, Glasgow Tramways Committee): I want to ask a question of the reader of the paper, and one of the opener of the discussion. I should like to know how he would work out the colours for this example. We have on one route 35 half-penny stages. (Laughter.) There are also on that same route 1½d. stages, 1d. stages, and 2d. stages up to 7d., and it would be interesting to hear from Mr. Flint how his colour scheme would work out in dealing with the excess tickets on that route. Another point I should like to ask about is this; a person paying an excess ticket will always be on the platform when he is paying and leaving the car. I understand that is the case. Do you not find it a temptation to the conductor simply to put the excess fare in his pocket instead of punching a ticket? Passengers do not always wait when leaving tramcars to get a ticket and put it in the box. I should like an answer to that. Then Mr. Smith suggests that they have made an increase in the fares since they started the pay-as-you-enter system, and he suggests that there is so much due to natural increase. Everybody knows that, but I should like to know how he determines between what is due to natural increase and what is due to the P-A-Y-E system? That is a very difficult problem for me to see through, and I should like an answer to that question. I am much obliged to the gentlemen who have spoken for the able way in which they have handled the paper, and I hope I shall have the information I am seeking when the reply comes.

Councillor D. T. J. Lyle (chairman, Maidstone Tramways Committee): I should like to ask the reader of the paper—which I consider very valuable, and shows an improvement on the present system—what becomes of the conductor who is placed on the car for perhaps eight or ten hours per day? There must be periods when he would leave his platform. What becomes of the car in his absence?

Mr. W. A. Luntley (general manager, Wolverhampton Corporation Tramways): In adding my thanks to Mr. Flint for his excellent paper, may I say that there are just one or two matters I should like to refer to. First of all, with reference to discount tickets referred to in the paper, Mr. Flint said that a green ticket is given in exchange for a discount ticket, and a passenger paying cash receives a white one. Is it not possible for anyone to be in league with the conductor if the conductor were so inclined, and for the conductor to get the benefit of this discount? I do not see how an inspector would be able to check it; he could not see into the conductor's bag, nor distinguish whether a passenger gave a penny or a discount ticket. I should like some information from Mr. Flint on that point. With regard to the blind and crippled persons, we have, of course, all possible sympathy with those who are blind and crippled, but it occurs to me that it opens the path for a similar application from those suffering from other afflictions if concessions of this sort are wanted. With regard to the P-A-Y-E cars, Mr. Flint says, "The contents of the deposit boxes are checked each evening and balanced against the tickets issued by the conductor." I should like to know whether each conductor takes away the tickets deposited by the passenger with him when he is relieved. I presume that is so.

With regard to a later paragraph, as to the advantage of the conductor being always on the platform, Alderman Flint says, "Another advantage is that the conductor, always being on the platform, is less likely to leave intending passengers behind." Well, we all know that there is a constant complaint of tramway conductors leaving passengers behind at the stages, but it occurs to me, if he is handling 30 or 40 passengers at a busy stage and dealing with the fares, that it is not possible for him to look out any better with this system than the ordinary system. In that connection, although I have not seen the Sheffield or Leicester systems in operation, I think perhaps the Sheffield arrangement is a little better, because he can get rid of a big portion by placing them inside, so that he would not have so many to attend to afterwards.

Mr. A. L. C. Fell (chief officer, London County Council Tramways): I should like to congratulate Mr. Flint on his paper, and the interesting account he has given of the P-A-Y-E system. I had the opportunity yesterday of inspecting the pay-as-you-enter system in

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Leicester, and there were one or two points which struck me, which I should like to ask Mr. Flint about. Can he let us know what the cost would be of altering ordinary cars so as to make the P-A-Y-E system possible? (Hear, hear.) The question of alteration of existing cars, speaking from my own London point of view, would be a very serious matter, because with our present platforms and staircases it would be absolutely impossible to institute the P-A-Y-E system. We had some years ago reverse staircases on our cars, but those reverse staircases unhappily did not comply with the by-law made by the London County Council, and the police authorities insisted on our altering the staircases on the first 400 cars, and that cost somewhere between £4,000 and £6,000. I understand if we institute the P-A-Y-E system we shall have to go back to the reverse staircase car, and so you can imagine with something like 1,750 cars to alter it would mean a very serious matter.

Then another item of cost comes in, and that is the question of the royalty and the apparatus one has to instal on the car itself. I noticed that in Leicester, with the platform divided, they made a sort of recess for the conductor, and I came to the conclusion that they must breed a specially thin conductor in Leicester, because it would be quite impossible for an ordinary London conductor to get in. I asked one of the conductors how he managed to get into the recess, and he said they worked them so hard in Leicester that they never had an opportunity of getting fat. (Laughter.) Whether the institution of the P-A-Y-E system has reduced the weight of the conductor I do not know; perhaps Alderman Flint will tell us, because we do not like to throw all the work on the conductor. The next point is that the driver should drive the car, and not look after passengers, and I think that is one of the greatest advantages of the P-A-Y-E system. Another thing I noticed was that they had no bells upstairs for the passengers to give warning when they wanted to stop the car, and it was necessary for the passengers to get up and wander to the end of the car, so that the man standing on the platform could see if anybody was coming off the roof. If we had our passengers in London wandering about on the top of the roof between the stages, I am convinced the number of accidents we have would be about trebled. We have a large number now, owing to the heavy traffic and the car having to stop suddenly. Passengers are apt to get thrown down, and if they were allowed to wander about promiscuously between the stages, I am certain those accidents would be increased.

Mr. Flint says the cars in Leicester run well, and to time, but one question that struck me was, "what time," because they do certainly lose a good deal of time at the start, where passengers are getting on. I happened to be there as the people from some theatres were coming out the night before last, and there were a large number of passengers trying to get on at the terminus. The conductor was certainly wonderful in the way he issued the tickets, but I noticed one old lady who did not take the trouble to take her purse out of her pocket before she got on the platform, and then began fumbling with her purse. She had to be put on one side. There was not much room, and it caused considerable congestion to persons trying to get in the car. I am afraid if we had to issue tickets in that way at a busy point there would be tremendous delay, and the result would be that our friends the opposing motor 'buses would come along and sweep up the lot, and we should not get them at all. (Laughter.) It is, of course, easy to put up a notice saying that passengers must have their fares ready, and that is all very well for the regular rider, who gradually learns—even a tramway passenger learns—but the casual rider does not know, and it is the casual rider who will cause all the trouble when you institute this system. Still, I do not wish to say the system should be condemned, because I think there is a great deal in it, and a great deal may come from the splendid pioneer work which Leicester and Aberdeen are now doing. I still have hope that we may have a system something like this installed on most of our tramways, so as to make the time on the journey as short as possible. I congratulate the reader of the paper on the excellent work he is now doing. (Applause.)

The Mayor of Reading (Alderman C. G. Field): I should like to say a few words on the point you emphasised, Mr. President, and ask the member for Aberdeen to explain his statement as to time saved on the route. We have it from him that the route is 2½ miles long, and that with the old system it took 35·1 minutes, and with the new system it takes 34·2 minutes, and thereby saves practically a minute. But he did not tell us that the speed at which the cars run at Aberdeen is only something under 4½ miles an hour. And I should say it would be very easy indeed ——

The President: Are you sure that statement is correct?

The Mayor of Reading: I took it down at the time. I am asking for the explanation.

A Delegate: The time given is for the round trip, the double trip.

The Mayor of Reading: Oh, then it is not only five miles an hour. I am answered.

Councillor W. H. Buist (Dundee Tramways Committee): Mr. Flint spoke of the fact that in Leicester the motormen had been relieved of the duty of looking for passengers, but I think he forgot for the moment that in Leicester it seems an additional duty has been put on the motorman of examining the tickets of passengers as they descend from the car, and it seems to me it is going from Scylla to Charybdis, and that the cure is worse than the disease.

I was going to ask Councillor Smith, of Aberdeen, how they check the passengers who have halfpenny tickets, as to whether they over-run the stage or not. I would also ask both gentlemen, who are advocates of the P-A-Y-E system, how they manage in the rush hours. I remember in one of the cities of the States I boarded a pay-as-you-enter car, and there were 121 passengers got on the car which seated 53, and I am quite certain 20 or 30 of them never paid, and I wonder how they would deal in the rush hours with abnormal traffic such as that.

Mr. H. Mozley (general manager, Burnley Corporation Tramways): I was very pleased indeed to see that Leicester and Aberdeen rose to the knowledge that they were losing fares by their defective system of checking, and whether you adopt the P-A-Y-E system of getting fares, or the system which is in operation, and has been in operation since 1881, on our own system at Burnley, namely the collection of tickets, it does not much matter to me; but I do feel sure that the tramway owners of this country up to now have lost very large sums annually, and therefore this is a very opportune subject to bring before this Conference. I do not intend to say more, except that I think this is a matter which deserves your very serious consideration.

Mr. J. W. Dugdale (general manager, Oldham Corporation Tramways): I should like an explanation as to the manipulation of ticket No. 7641, which is illustrated in the paper.

Mr. W. Clough (general manager, Bury Corporation Tramways): In considering the paper which Alderman Flint has so ably placed before us, I have tried to remove from my mind any prejudice which, along with other managers, I have had against this American system of fare collection. The opinions of the author are based on actual experience, and for this reason should not be opposed without some hesitation. At the same time, many of us whose daily task it is to study the proper collection of fares can see difficulties which, were it not for the Alderman's experience, would lead us to conclude that the system would not have worked so satisfactorily as he has been able to state. If he had told us that this system was in use on a very slack route, we could have understood his conclusions, but he states that the problem at Leicester was how to get the fares at rush hours, and that the solution is to get them on the platform. With a car with such a short platform as shown in the illustration, it must of necessity take more time to do this, and to this extent the car must be delayed at busy loading points; but it may be that this time is regained *en route* by the fact that the conductor is always at the back of the car to restart it.

We are also informed that passengers are now allowed to leave the cars *en route* by either platform. Is this desirable? Will it not take the attention of the motor-man from his driving, for we must remember that under this system the motor-man has to see that the passenger has paid his proper fare, and it is also the motor-man who has to see that an excess ticket is obtained in cases of overloading? This would be bad enough *en route*, but at the terminus, when a large number of passengers are hastily getting off the cars, for instance, to go to a football match, it would be an absolute impossibility. I may point out that the Alderman tells us that the overlapping passengers, who are very numerous, have been diverted to another section. If this system is to be extended over the whole of the tramway system of Leicester, those overlapping passengers will have to be dealt with.

The remark that those P-A-Y-E tickets are not punched seems to imply that there is something special in connection with those tickets, which does away with the necessity for punching. I cannot find that there is any difference from any other ordinary ticket, yet on practically every tramway system it has proved essential that the tickets should be punched, and that we cannot solely rely upon an inspector boarding the car. The mention of not punching the tickets raises a suspicion that this is omitted in order to save time when loading the car at busy times. It is no surprise to hear that Mr. Flint has frequently been asked whether the system would work in towns where the fares are varied and complicated, and I must join issue with him when he replies that there would be very little difficulty in adapting this system to meet any requirements. Many systems have all the kinds of tickets in use in Leicester, but it makes a huge difference when, in addition, you have fares ranging from 1d. to 4d. You have only to read the instructions to conductors at Leicester to realise what would have to be done in towns where there is a varied fare system.

In the conclusion of the paper mention is made of a method of handling prepaid and discount tickets which prevents fraud. A white ticket is issued for cash, and a green ticket for prepaid tickets. When the effect of this is reasoned out, does it not come to this, that in Leicester each passenger can be relied upon to see that he gets a ticket of the correct colour? You cannot do that on many tramway systems, and Leicester is to be congratulated on the interest which the passengers take in the collection of fares. (Applause).

Mr. J. M. McElroy (general manager, Manchester Corporation Tramways): I have recently had an opportunity of studying this question collaterally with other questions in the United States of America, and it is perhaps a little interesting at this stage to see what the history of this P-A-Y-E system has been. On my former visit to the

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States, six years ago, the two factors connected with the operation of tramways there which attracted my attention were, first, the danger which attended passengers boarding the cars, owing to the peculiar construction of many of their long open-sided summer cars; and, secondly, their method of fare collection. We all know that in those days many companies in the States were paying claims for accidents amounting to something like 5 per cent. of the gross takings. You know no such thing obtains in this country. The number of accidents, due to boarding and leaving the cars, were very large. As to the second point, the method of collecting the fares, I do not know whether you all know what the system was. You paid your nickel to the conductor, and he pulled a strap at the roof or side of the car, and the fare registered at the end of the car; there was no giving of receipts or anything of that kind.

These two things appeared to me to be two very weak points in the operation of the American tramway systems, but on my recent visit I found a great change had taken place as regards these two points. The change was connected with the keeping of the conductor at the rear end of the car, in order that he might collect everybody's fare, and also prevent tail-end accidents on the car. Everywhere I went they said their accident claims had gone down enormously, and their receipts had gone up proportionally on account of seeing that every passenger properly paid his fare. I think the United States and Canadian people were led to do this and to effect these improvements because they have a universal fare, which is a nickel, and their operating expenses, like our own, have a constant tendency to go up. They are spreading tramways in all directions, and they were finding that the margin between receipts and operating expenses was growing so small that they had to make these changes. They have done exceedingly well by this system of pay-as-you-enter. Nowhere did I see any undue crowding to get on the cars, and I rather fancy that is not one of the weak points of the P-A-Y-E system so far as the United States is concerned. But when you attempt to apply the conditions to our own country, you will find a different set of circumstances. Here we have been in the habit of giving every passenger a receipt for his money. We tell a passenger he can travel from one point to another, and that he must get a receipt for his money. If it were possible to have a simple condition of affairs such as exists in Leicester, I think pay-as-you-enter is the right thing, because we can keep our conductors on the platform and get our fares, but when it is to be applied to conditions such as obtain in London, Glasgow, and Manchester, where we have a large number of overlapping fares, it seems to me it is practically impossible to do it. With regard to the alteration of cars, I think if the principle is admitted that you should have the conductor on the platform to prevent accidents and get the fares, if it is possible it ought to be done.

I am much interested in what Mr. Fell said about the motorman having nothing to do with the loading of the passengers. Strange as it may appear, one of the newest kinds of car in the United States is what they call a near-side car, where the passengers board the car at the motorman's end, and it is the motorman who opens the door for the passengers and closes it, the idea being that as he cannot start the car until the doors are closed, people cannot have an accident in boarding the cars. It is interesting to compare the different ideas—what Mr. Fell thinks would be suitable for London, and the newest idea of tramcars in the States. I think, if it were possible to have a simple flat fare, then pay-as-you-enter would be is the right thing. (Applause.)

Alderman G. BANTON (vice-chairman, Leicester Tramways Committee): Speaking of the system which obtains in Leicester, we have tried it because we wanted to gain knowledge and experience. In the first place, we were not satisfied with the methods in existence, and we knew there might be some improvement, and seeing the necessity for having more cars we thought it would be wise to find out if there were any new method in existence, and if our cars could be built on the most modern system. The Americans are now pretty alert, especially in the collection of nickels, and they are not easily led away by a new thing because it is new, but are always ready to adopt the best system possible. The fact that they have done something in this direction was an encouragement for an Englishman to try it, and in Leicester we decided that the ten new cars should be built on the principle of pay-as-you-enter, and a platform was constructed which would facilitate this. We have had for some months our first pay-as-you-enter cars, and taking it broadly we are fully satisfied with the results.

First of all, we were alarmed at the number of accidents and claims for damages. You have the same claims in your own towns I suppose, but we felt we had some share of the responsibility, and that it was the duty of any committee to obviate accidents if possible. So the system of pay-as-you-enter, and keeping the conductor always on the platform, has by experience proved to be a success. Our expenses now are, comparatively speaking, nil; we have had no claims put in up to the present time, and that is one great point. We have not been able to gauge much by the returns, owing to the alteration of the system. I happen to live near the route, so I know why it is that the receipts have apparently diminished £29 over a certain period, and on the other route in the same portion of the town they have gone up to a tremendous extent. We know it is not all due to the small growth of population or the growing habit of riding, so we credit a portion of that to the overlapping system, and we know we have not lost anything by adopting the new system of pay-as-you-enter. Altogether there is the fact of accommodating our passengers—and this is a very important point—and the absence of inconvenience caused to the passengers by loading up. I have stood many times and watched, and I dare guarantee that we fill a car as quickly by the P-A-Y-E system as could be done without it. That is a bold assertion, but I think you will find in time the assertion can be proved.

You all know that a crush of people will not get through a door so quickly as an organised body of people. Your queues at the theatres and queues at the stations demonstrate that. You want to organise into queues, and offer facilities to get the passengers accommodated more quickly. People will adapt themselves to it; they do not crush and push and get half a dozen people on the platform at the same time; they take their turn and have their money ready, and you get the people on the cars more quickly.

A point was also raised as to whether, by collusion, the conductor could keep the fares. I doubt whether any gentleman has devised any perfect check, and I do not suppose there is any perfect check where you can guarantee there is no chance of collusion. I think this is the nearest approach, and if there can be any defrauding it is at the minimum under this system. As to the time taken, you have to gauge the traffic by the total time, and not by one particular point, and we do know by experience that we can get the cars through in a shorter time

**Alderman S. Flint**

*(Chairman, Leicester Corporation Tramways Committee).*

than hitherto. We do not take our time in Leicester: we like to get the traffic through as quickly as possible, and we can compare with any other towns with regard to the length of time per mile. So, taking all the points, we think we are justified in going still further with this experiment.

I had one of the principal objectors to see me the other day, and points were raised against the new system, and we have got over them. But there was one very grave defect, and that was that they were deprived of the through running, and when I informed this gentleman that we were going to propose the building of more cars, so that we might have through running, he said "If that is so, we shall be heartily satisfied." The system itself is not bad. Anyway, we are going forward with the building of new cars in Leicester, and we think the system is so successful that we are going still further to extend it. As to the cost, it would depend upon whether you think it advisable to spend more money. In Leicester we have a fairly profitable concern, and we do not fear the new system. Anyway, if you do not adopt the P-A-Y-E system, the new platform in itself is a great advantage, and your passengers will find the benefit of the larger platform and improved staircase. In Leicester, after all the points have been taken into consideration, the Traffic Committee—of which I have the honour to be chairman—are practically unanimous on the good points, and have resolved to order new cars. (Hear, hear.)

**ALDERMAN FLINT'S REPLY.**

Mr. Alderman FLINT (replying on the discussion): I am not the author nor the inventor of the P-A-Y-E system, and all I was asked to do was to give an account of how it is answering in Leicester. I am not going to say we have reached finality or perfection, but I certainly think, from the few months' experience we have had, that the system

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has come to England to stay. Alderman Banton has just told you that the Tramways Committee of Leicester—and I think they were unanimous, except for one vote which was neutral—have decided upon an extension, and we are ordering another ten cars, in order that we may have a through service. I have had questions asked as to the time occupied, and what did I mean by "usual time." I meant by saying that, that it takes as long to do the service now run as under the old system, but when we have the new service from one side of the town to the other through the centre, we shall probably save, as far as we can calculate, one car in twenty; that is to say, nineteen cars will do the work of twenty. If you can carry that out, there is not much cause to complain. Mr. Fell mentioned the case of an old lady, which caused a little consternation. I think old ladies of either sex cause consternation (laughter) whether in tramway matters or otherwise, and we do not devise a system to meet isolated cases of old ladies. We have to go on broad lines and meet a public want, doing it in the most efficient and economical manner possible, and to the satisfaction of the people.

When we run our cars through and right across town, I think we shall have as complicated a system as exists anywhere. Of course, I have not given you every little difficulty we had to contend with, but we have overcome them all, and the number of exceptional cases we have with all our tickets I think are about as complicated as any system in the country. We have not such a big system, but it is a complicated system, and my own impression is that with the different marks and the stripes on the tickets we can get over all the difficulties—even the case of the gentleman who had 38 stages on one route.

I am informed that the 'bus companies in London have ordered 24 cars to try this system, and that perhaps will be information for Mr. Fell. It will be an interesting experiment for London. I am glad to find that for the Aberdeen tramways they have more complete figures, because they are carrying on the system on the same basis as before. We followed, and it has come out all right, and I am sure it is a cheaper system, and on the whole there is less delay with this system than the other. The delay is caused at the starting point, but you pick up more time on the rest of the route.

I think Mr. McElroy has given a good account of what has taken place in America. Two years ago I was in America and Canada, and I saw there was something in this system. I do not know that everything is necessarily good because it comes from America or Canada, and there are many respects in which they can learn from English customs and systems, but in this particular instance I think the system is a good one, although it was started in America. Probably you know they have some 20,000 cars running in those two countries under this system, and if it answers there I do not see why it should not answer with us. Perhaps you will excuse my not answering all the points raised, because it would take up too much of your time; but if there is any specific question I have not referred to, I shall be glad to reply.

The PRESIDENT: We shall be very pleased to hear Mr. Smith.

Mr. T. R. SMITH (electrical engineer, Leicester Corporation Tramways): It is difficult to give the exact cost of alteration, because we have not converted one car, but for the lengthening of the platform at each end and providing another staircase it works out between £30 and £40 per car. The royalty is £20 per car.

Mr. MOZLEY: Lengthening the platform affects the clearance on the curves. That is a difficulty on the bulk of English cars—the swing of the car. How do you get over that difficulty?

Mr. SMITH: There has been no difficulty experienced yet in Leicester.

Mr. FELL: Is the royalty in perpetuity?

Mr. SMITH: It is one payment only. The £20 royalty is paid for each car adapted to this system, and as long as that car is on the road it is clear from any further payment.

The PRESIDENT: I am sure it is your wish that we tender to Mr. Alderman Flint our hearty thanks for the excellent paper he has given us, which has called forth this interesting discussion.

The resolution was carried amid applause, and the Conference then adjourned for luncheon at the Grand Hotel.

## LUNCHEON ON WEDNESDAY.

On the invitation of the Chairman (Alderman Sir William Clegg, J.P.) and members of the Tramways Committee of the Sheffield Corporation, the members of the Association were entertained on Wednesday to luncheon at the Grand Hotel. Mr. Councillor A. J. Bescoby, the deputy-chairman of the committee, presided in the absence abroad of Sir William Clegg.

After the toast of "The King,"

Mr. Councillor A. J. BAILEY, J.P. (member of the Sheffield Tramways Committee) proposed the toast of "The Municipal Tramways Association (Incorporated)." He said: I have a very pleasant duty to perform. I do not know why I should have been selected to have proposed this important toast, or whether your President, who is one of the shrewdest and acutest business men I know, thought it would be an advantage to link a Labour leader up with the Municipal Tramways Association or not. I do not know, but I am without question a strong believer in organisation, and I feel pleased from one point of view that I can propose this toast without any feelings of regret whatever, because I believe your Association have never attempted to come into direct conflict with the organisations with which I am connected. I am certain they have done a good deal to improve labour conditions in several directions. Your Association is, comparatively speaking, new; but I venture to say that in its short period of existence, some 13 or 14 years, it has accomplished a very great amount of work indeed, and work that has been beneficial to our municipalities and of benefit to the general public. This robust growth of the tramway system is remarkable. I notice in one of your papers to be read during the week the writer says that some short time ago it was said that tramways were played out; so far as I can see we are only just being played in. (Applause.) There is as great scope for the Association in the future as there has been in the past. The strides we have made during these 13 or 14 years are amazing. From 1,200 miles of tramway we have got up to nearly 3,000, and we have an invested capital of £53,000,000. And it is pleasing to those of us who are connected with municipalities to know that we have an Association of this character represented here to-day which is endeavouring to keep its fingers on the pulse of the tramway world, noting every movement that is going to be of benefit and advantage, and checkmating, if possible, every movement that is detrimental to the best interests of tramways. You have been able to nationalise things; you have been able to centralise things, and you have been able not only to obtain information from all sources, but to condense it and put it in understandable form and stated as near perfection as it is possible for man to get. And whether we are dealing with difficulties of municipalities, or with difficulties with the Post Office, we always find advice or information that is useful from the Municipal Tramways Association. If, again, it is a question of the promotion of a bill in the House of Commons, either in the interests of municipal tramways, or a bill that may tend to militate against municipal tramways, we find your Association to the front, and assisting municipalities in a way that I venture to say it would be very costly for them to get people professionally to do. If it is a question of dealing with the Board of Trade; if it is a question of standardising tyres or axles; or a question of rail corrugation, your Association has been to the front all round. So, Mr. Chairman, I have pleasure in proposing this toast. I do not agree with the gentleman who said that we were getting to the end of the tramway world. I think there is any amount of scope for development, any amount of scope for work for the Association in the direction in which it has been working in the past, which I do not hesitate to say has not only been of benefit to the municipal bodies, but has been of benefit to the public in general. I am in private life a trade union official. I believe in organisation all round; the better the organisation the stronger, and the stronger it is the better it is and the more advantageous it is to the general public good. I have very great pleasure in asking you to drink this toast of "The Municipal Tramways Association (Incorporated)." (Applause.)

Alderman H. LINSLEY (chairman of the Salford Tramways Committee and vice-president of the Municipal Tramways Association) replied: As an old member of this Association and as a friend of every member of the Executive, it gives me very great pleasure indeed to reply to this toast. I think the proposer of the toast has been very generous in the things he has said with regard to our Association, but I believe the Association does deserve everything he has said about it, because I believe that it is doing very excellent work. There are very many people who think that the whole work of this Association is the Conference which we hold once a year. That is a very great mistake. We have a very excellent Executive—barring myself of course—(laughter)—and during the whole of the year this Executive Committee is trying to settle things and study things and solve the difficulties which arise in regard to city traffic. At the Conferences every year, such as we are holding now, we take stock of the position, so to speak, and review the progress we have made. During the present year we have had some very difficult matters to negotiate, and in one or two cases our President, Mr. Fearnley, your own manager here in Sheffield, has come out in very grand style; he has shown us what he is made of. When we met the Postmaster-General in regard to guarding of overhead wires, the President rendered excellent service; it is true that we have not got the satisfaction we should have liked, but I was having a chat with a town clerk the other day, and he is very sorry we have agreed to the terms proposed to us, because he is quite prepared to fight the Postmaster-General, who he says is altogether wrong in making those terms. He has thrown out a challenge, and is quite prepared to meet him in court any day and test the case. I hope he does, and I hope the Conference will support him. I do not know whether we could change the Postmaster-General's views or not, but anyhow I should be inclined to have a try by some means or other. As a very old member of this Association, I do appreciate the kind remarks of the proposer of this toast, and have very much pleasure in responding. (Loud applause.)

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## WEDNESDAY AFTERNOON.

The Conference was resumed at 2-30 p.m., and the President at once asked Mr. Fenton to give his paper on "The Maintenance of Paving on Tramway Track as affected by Section 28 of the Tramways Act, 1870."

Councillor Wm. C. Fenton: Mr. President,—I think I will reverse the order of things, and before I proceed with my paper I wish to extend my acknowledgments to the gentlemen whose names are at the end of it. I mention them first, because our President, Mr. Fearnley, and the other gentlemen named, have supplied me with such valuable information that I feel it is not merely a cursory acknowledgment, but a real and necessary acknowledgment of the assistance they have given in the preparation of the paper I wish to lay before you this afternoon.

Mr. Fenton then read his paper.

# THE MAINTENANCE OF PAVING ON TRAMWAY TRACK AS AFFECTED BY SECTION 28 OF THE TRAMWAYS ACT, 1870.

By Councillor Wm. C. Fenton, F.R.I.B.A., A.M.Inst.M. & Cy.E.

According to a speaker (Sir J. H. A. Macdonald) at the Imperial Motor Transport Conference on July 25 last, "the day of the tramway was over," and if that be the case it would be a waste of time either to discuss the subject matter of this paper, or for you to attend in such numbers at this important Conference—unless you had assembled to pronounce a solemn requiem on the demise of the vast concerns which you have hitherto carried on with such benefit to the community generally. But one is inclined to think that such statements are more than premature; that in this case "the wish was father to the thought," and though undoubtedly the motor has and will have great uses, you must still look forward to a long life to the tramway and continue to deal with all the phases which will increase or decrease its efficiency from year to year.

It needs, therefore, no apology for bringing this question of paving before you to-day, and though the law as laid down by Section 28 of the Tramways Act, 1870, has been the subject of more than one discussion in previous Conferences the opinion is generally expressed that the matter has become increasingly urgent and deserving of fuller discussion in view of the changing circumstances of the times.

In dealing with this subject, I am desirous of presenting, as far as possible, an impartial statement of the present aspect of the question; not to urge my own views, but to lay before you a basis for discussion which it is hoped will prove both interesting and instructive, and may in the end lead to some satisfactory settlement of an important and difficult problem in tramway finance and management. To refer for a few moments to the historical side of the question, I do not intend to weary you with many dates and details, but only sufficient to lead up to its bearing upon the important question at issue.

When tramways were first introduced into this country by George Francis Train, about 1861, they were laid by arrangement with local authorities and not by Parliamentary powers. These "tramways" were such a nuisance to general traffic that they were cleared away by mandamus. In 1868, however, three Tramway Acts were passed for the Metropolis, and the numerous applications for private Acts resulted in the Tramway Act of 1870, which stands to-day as the principal authority governing tramway procedure and practice. I need not refer to this Act in detail; its provisions are well known to you all, but Section 28, as the subject matter for this paper, will be referred to later. Experiments were made in steam traction as early as 1873, but it was not till 1880, or a little later, that it became an accomplished fact. The first cable system was inaugurated at Highgate in 1884, and electric traction by accumulators was first tried in Birmingham in 1890. The advent of electric traction by overhead wires led to the passing of the Light Railways Act, 1896, by which the procedure for the acquisition of powers for tramways and light railways was much simplified.

In view of recent events it is very interesting to note that Lord Morley when piloting the Bill through the House of Lords said "that light railway includes not merely all tramways, but any railway which the Board of Trade thinks may justly be brought within the scope. It certainly includes tramways in towns, and it might include large trunk lines throughout the country." The present House of Lords, or at any rate its Law Lords, apparently, do not agree with Lord Morley's interpretation of its powers, and the conundrum, "when is a tramway a light railway?" or vice versa, still remains to be solved.

I need not refer to the various methods of electric traction—overhead, surface, or conduit—which have developed during the last 10 to 15 years, because in every case—except, perhaps, with the small exception of surface-contact systems—they are all more or less affected in the question of road maintenance.

Now Section 28 of the Act of 1870 provides, *inter alia*, that:

> "The promoters shall, at their own expense, at all times maintain and keep in good condition and repair, with such materials and in such manner as the road authority shall direct, and to their satisfaction, so much of any road whereon any tramway belonging to them is laid as lies between the rails of the tramway and (where two tramways are laid by the same promoters in any road at a distance of not more than 4 ft. from each other) the portion of the road between the tramways, and in every case so much of the road as extends 18 inches beyond the rails of and on each side of any such tramway."

It must be remembered, also, that the Act did not then provide for local authorities to work their own systems, but contemplated companies only providing this public convenience. It was, therefore, necessary that the public should be safeguarded and protected as carefully as possible both as regards safety and sanitation. Moreover, only animal power could be utilised under the Act, and the wear and tear of the paving was likely to be much greater (being confined to rigid lines) than if spread over the whole surface of the road.

Experience showed that even in the days of horse traction there were two sides to the case. How many times have most of us seen, as well in those days as to-day, heavy traffic having about the same gauge as the tramways taking advantage of the easier traction by deliberately going in front of the trams and adding very considerably to the wear and tear of the paving? And though the increased speed of the electric trams has to a large extent modified this practice of the slow and heavy vehicle, yet the faster traffic, both heavy and light—as they are undoubtedly entitled to—use the tram tracks in preference to the sides of the roads. Though this Section of the Act was necessary in the interests of the public, and, as I have said before, experience showed that even horsed tram traction by no means had the monopoly of wear and tear of the paving, yet as long as companies who had "neither bodies to kick nor souls to save" worked the systems, and presumably made money out of them, any grievance which they had in this respect would not be considered. Even the introduction of steam traction made very little difference, and probably justly so, because hot ashes and cinders contributed to the wear and tear of the roads. The cable systems might have brought the question into prominence had there been more of them and if they had been owned by municipalities. The advent of electric traction as an agreeable and paying novelty only caused a voice to be raised here and there, and it was not until the last six or seven years that the injustice of the present system was voiced in definite form. This has been mainly brought about by two causes:

1. The obsolescence of the factors upon which Section 28 was founded.
2. The great increase in both heavy and light motor traffic since the development of internal combustion engines, and improved steam tractors.

At the 1907 Conference a certain amount of discussion took place, in which Councillor C. F. Spencer, of Halifax, expressed his Committee's opinion that the present state of the law was an injustice, and Mr. Blain, of West Ham, brought forward one of the strongest arguments for revision that had up to then been enunciated, viz: that in many cases the camber of roads had been so arranged that the whole of the traffic should travel on the area maintained by the tramways. The matter was then referred to the Executive for consideration and report.

In the following year (1908) the Executive reported to the Nottingham Conference that they could not recommend any definite action "at the present time." This led to an animated discussion, and Mr. Blain's resolution to refer the matter back for further consideration was lost by 41 votes to 20. It was at that meeting, too, that one probable solution of the difficulty—differential rating—was mooted.

In 1910 the question was raised at both the Tramways and Light Railways Congress and the Municipal Tramways Conference: at the former, in Mr. Fred Coutts' paper on the necessity for revision of the Act of 1870, and at the latter, in Alderman Flint's paper, in which he said:

> "The old custom under which all tramway committees have to keep in repair the centre of the track and 18 in. outside the rail is also one that calls for re-consideration and revision. It was quite right under the old conditions in the days of horse cars, when they were run for private profit, and when roads required constant cleaning and repairs on account of the car traffic. But the running of electric cars does not involve this extra expense to nearly the same extent; therefore the continuance of this custom means that tramway committees have to relieve highway committees of their responsibilities, or, in other words, passengers on the cars have to relieve ordinary ratepayers of their burden.
>
> "A first step should be to relieve the tramway committees of the duty of maintaining the 18 inches outside the rails. The wider question might then be left open for a time."

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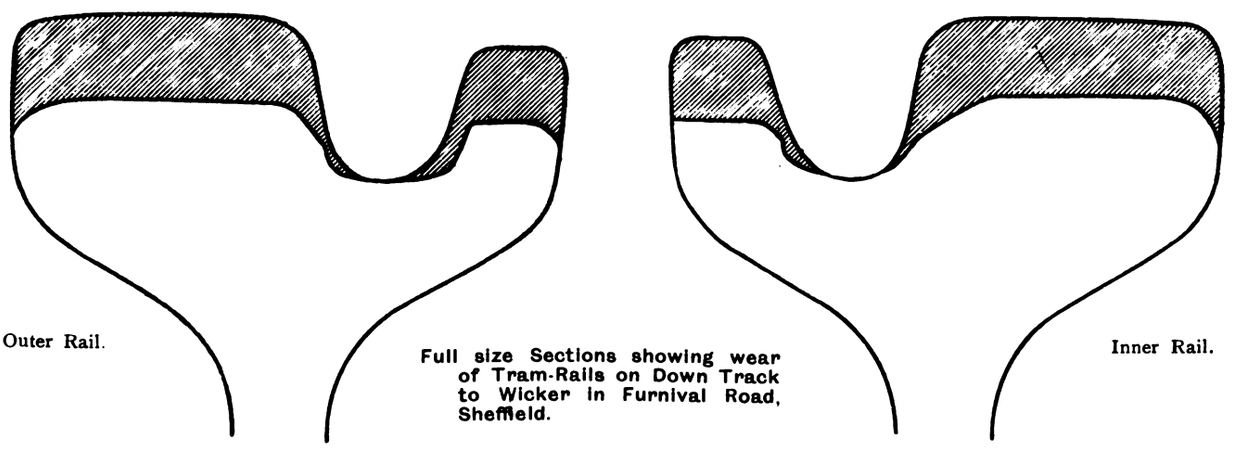
At the Edinburgh Conference of the Tramways and Light Railways Association, in 1911, Alderman Wm. Ivey, of West Ham, in a paper, made the following suggestions:

> "*(f) Amendment and Revision of Clauses on Track Maintenance and Cleansing, etc.*—These clauses were provided for the days of horse and mule traction, and were then fair and equitable to a certain extent. There can be no justification for the continuance of what is now a glaring injustice. I raise no complaint as to the obligation to construct the permanent way and track, but suggest that, having done that, the only further charge against the tramway should be the difference between the annual cost of repairs of the paving nine inches on each side of the rail and the surface generally of the whole carriage-way. I admit that, owing to the presence of the rail and the difficulty of making and keeping a good joint between rail and road, there is a considerable difference in cost; therefore the tramways should pay *that* and no more, but would in all cases make good, after opening up for rail or bond repairs.
>
> "*(g) Rating.*—Tramways and light railways to be rated as railways at one-fourth of rateable value."

The question was raised again at your Glasgow Conference the same year, and you will all remember Mr. Blain's remarks in his presidential address last year.

Of the two causes for agitation in favour of the revision of the Act of 1870, No. 1 hardly needs argument—it is self-evident. No. 2 is "where the shoe pinches," and it hurts more in some places than others. The enormous increase of motor-drawn vehicles in recent years has revolutionised street traffic, and, altogether apart from private cars (which I do not think are an important factor in the case), commercial motors—both steam and petrol—with trailers, heavy loads and high speeds, have caused increased wear and tear, and consequently heavier burdens upon tramway undertakings in the maintenance of paving within the statutory area of their tracks. This has affected local authorities in other streets and roads besides those used for tramway purposes. To such an extent has this affected the general construction of road paving that the Metropolitan Committee on Materials and Means of Paving the Streets of London report that the depth of concrete foundation has had to be increased from 6 in. to 9 in. and even 12 in. in some cases.




**Full size Sections showing wear of Tram-Rails on Down Track to Wicker in Furnival Road, Sheffield.**

In a paper read at the recent annual meeting of the Institution of Municipal and County Engineers, our highway surveyor, Mr. W. J. Hadfield, specially referred to the increased cost of road maintenance by heavy steam traction in different classes of streets, and this has, without doubt, seriously affected tramway tracks, as well as streets without tramways. Apart altogether from the fact that the trams do not contribute to the wear and tear of the paving, there is also the important fact that in nearly every case far more vehicles than tramcars use the same street.

To quote two local instances: In Furnival Road (near the Victoria Station) in a recent 24 hours' observation there were 3,327 vehicles proceeding in the same direction as the *down* track, and only 137 tramcars during the same period. Those 3,327 vehicles were spread over every portion of the available road not occupied by the *up* traffic. The *down* track referred to is very little used by tramcars, but the result to the rails—apart from the paving of the road—is shown by the full size section given above, kindly supplied by the highway surveyor. In High Street, where the largest number of trams pass to and fro, there were on an average day from 6 a.m. to 9 p.m. 3,494 vehicles (excluding bicycles), as against 2,940 tramcars, or 554 more, but this was in a wide street, where the tram tracks are not so much used for ordinary vehicular traffic as in narrower streets. In this case the carriage-way was 50 ft., and in the former case 31 ft. wide only.

Mr. A. L. C. Fell has kindly supplied me with two typical cases in London from 8 a.m. to 8 p.m.

In Queen Street, Hammersmith, there were 336 electric cars and 4,140 other vehicles (excluding bicycles), including 973 motor 'buses. In Lea Bridge Road there were 547 electric cars and 2,522 other vehicles, including 771 motor 'buses.

Cases such as the above, if they do not provide an unanswerable argument in favour of the repeal or amendment of Section 28 of the 1870 Act, do provide good reasons for a searching enquiry into the operation of the clause with a view to revision. I am not able to lay before you to-day the cost of maintenance of tramway tracks in this country, but if I could, I venture to think the result would be startling.

But if you will carefully consider the figures I supply in appendices to this paper (figures which in some cases include permanent way, and from which a deduction of 50 per cent. may be taken as an extreme figure for rails, bonds, joints, and fish plate renewals and maintenance) you will have amounts which speak for themselves and need little further comment. If you also refer to the figures quoted in THE TRAMWAY AND RAILWAY WORLD for July 11, 1912, you will find that for the 16 municipal systems given in Appendix "I." it amounts to £132,584 per annum for maintenance of permanent way, and £123,787 per annum for rates, sufficiently startling figures to be worthy of the most careful thought and consideration. In the appendices I also give the cost of repairs and maintenance of permanent way, and rates on same, per mile of single track of a few of the municipal systems upon which some of the totals referred to above are founded.

The decision of the House of Lords on July 24 last, in the Tottenham Urban District Council's rating appeal in connection with the Metropolitan Electric Tramways, Limited, has accentuated the sense of injustice which tramway concerns feel in connection with this subject. In our own city it has caused an increase of over £4,000 on the rates for the present year. The rating of tramway tracks is practically a rent for the "partial monopoly"—if I may use the phrase—of a portion of the street, and if assessed under Section 211 (1) (b) of the Public Health Act, 1875, in the proportion of one-fourth only of the net annual value, gives a very handsome rent to the local authority. But if, in addition, it not only keeps in repair the larger area of the road, and out of its profits relieves the rates—and in some important cases pays a proportion of the cost of street improvements—the argument for reconsidering the present state of the law becomes much stronger.

*The Times*, in a leading article on August 23 last, dealing with the motor omnibus question, sums up the position in an able and impartial manner which should appeal to all reasonable minds:

> "It is true that the omnibus companies do already contribute to a certain extent to the upkeep of the roads. They are rated on their garages, and they pay a petrol tax amounting to about £40 per omnibus per annum. The disposition of the produce of this last tax, after it has passed into the hands of the Road Board, is a matter that is obviously not under their control. If the money that is paid for petrol consumed in Piccadilly or Peckham is spent in the improvement of roads in the provinces, that is no concern and no fault of theirs. Their case is that they pay the tax, and that it might be used more largely than it has been for the reduction of the rates in London. On the other hand, they are not rated to the same extent as the Council's tramways, and some adjustment of the inequality between the two chief forms of public locomotion in the Metropolis is undoubtedly called for. The motor omnibuses are just as much 'the people's' conveyances as the tramcars. *But there is no reason why the concern run by the municipality should be handicapped in comparison with that which is the property of private companies. They should be placed on an equal footing, always keeping in view the fact that both of them exist primarily for the convenience of the public.*"

Let me summarise the arguments for and against the repeal or revision of Section 28 of the Act of 1870.



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**REASONS GIVEN FOR REVISING SECTION 28 OF THE TRAMWAYS ACT, 1870.**

1. The Act was based upon the use of horse traction only, involving wear and tear of the paving by reason of the method of haulage provided.
2. In recent years the form of traction has completely changed, and systems unthought of in 1870 have been adopted throughout the country.
3. Electric traction causes no wear and tear to the pavement, except against rails when becoming loose or worn down.
4. Tramways pay whole cost of paving, both initial and annual, and usually of a better class than would otherwise be the case.
5. Tramways are rated not only on their depôts and offices (a portion of which goes to maintain the streets generally), but on the whole of their track, whilst motor 'buses and all other vehicular traffic are rated only on their buildings, which often represent a very low capital expenditure and annual value.
6. Some tramways contribute towards the cost of street improvements, to which all other increased traffic pays nothing—except, as do the tramways, in the rating of their buildings and machinery.
7. Track paving is seriously damaged by both heavy and light motor traffic, in addition to horsed vehicles, and the cost of repairs is annually increasing.
8. The decision of the House of Lords referred to above imposes a greater burden of rates.
9. Many tramways, in addition to their rates, contribute large sums towards the relief of the rates and other public purposes.
10. Largely increased rateable value of surburban and central districts over and above any depreciation which may be attributed to them on line of route.
11. Improve the public health by cheap and rapid transit to the suburbs, enabling the workers to live in a better atmosphere, and thus help to solve the housing problem.
12. Save local highway authorities large sums per annum in repair and maintenance of streets.

**OBJECTIONS TO REVISION.**

1. Tramways "monopolise the streets" and divert traffic on to other streets.
2. Cause increased wear on the sides of tracks.
3. In most cases contribute nothing to street improvements.
4. All vehicles pay in their rates their share in the general up-keep of the streets.
5. Any revision of powers which would relieve tramway undertakings would increase the burdens of local authorities not owning tramways, and in cases of municipally owned tramways would add to the cost of highway committees.
6. Any such relief where tramways are municipally owned would only be a case of "taking it out of one pocket and putting it into another."
7. No material saving to highway authorities, owing to increased traffic diverted by tramway track.

**REPLIES TO OBJECTIONS.**

1. Tramways do not "monopolise the streets." The figures already stated for London and Sheffield are typical of and could be repeated in scores of other towns, all of which tend to disprove this assertion.
2. Whilst in some cases increased wear and tear does take place at the sides of the track, this is by no means universal. Careful observation has shown that thousands of vehicles, especially fast moving, use the tracks on account of the easier traction. In some places the camber of the roads encourages this usage, whilst in many cases there is no appreciable distance between the track and the kerb to allow of vehicular traffic forming its own track and adding to the maintenance of the sides.
3. This may be correct in most cases, but neither does the increased traffic caused by the development of petrol and steam motor traction pay anything towards the wider streets necessitated as much by *their* traffic as by tramways.

   The London County Council, which has been hit so hard by motor omnibuses—both in their revenue and in the cost of maintenance of paving—is paying (up to March 31 last) on a sum of £607,743 for street improvements. Sheffield, up to the same date, has paid a sum of £61,898 towards service of debt for street improvements, representing interest and sinking fund charges on £190,473.

   For the last financial year Manchester paid the sum of £5,115 by way of interest and sinking fund on an amount of £113,975 allocated for street improvements (see Appendix "B," page 323).

   So that in addition to the rating of the track, which in itself contributes to the cost of street improvements, some municipalities pay special contributions whilst other vehicular traffic pays nothing.
4. Agreed that everybody (even those living in "unadopted" streets) pay in their rates towards the maintenance of street improvements, but this argument is good only up to a certain point. For many years the law has provided that payment shall be made for extraordinary traffic, and it can be and is argued that streets which were originally paved for, at most, heavy horse-drawn traffic were not constructed for the heavy motor traffic which has appeared in recent years. The State has further recognised this principle in the petrol tax, which is intended to assist in the strengthening and improvement of roads necessarily brought about by the enormous development of motor traffic. Unfortunately the yield of the tax is not appropriated to the district where the increased cost of maintenance is necessitated, and probably this allocation would be difficult. Certainly no tramway authority has received any contribution towards the increased cost of their track repairs. A writer in *The Times* on August 22 suggests "that the exemption from horse-power duty which was created by Section 86 (3) of the Finance (1909-10) Act, 1910, be abolished," meaning, I take it, that motor 'buses and other hackney carriages should, as well as other vehicles, pay the increased duty imposed by the Act. The increased duties then payable might form a fund which should be placed at the disposal of the local authorities, and a certain portion of it allocated towards tramway track repairs.

   Parliament has also again recognised this principle of extraordinary traffic this year, *inter alia*, in the Brighton and Hove Omnibus Company's Act and in the Chesterfield Corporation Act—the latter authority having to pay one-third cost of widening roads and all extra cost of road maintenance due to motor 'buses and trackless trolley vehicles, the roads having first to be put in satisfactory condition for the present traffic.
5. This objection touches a tender spot and appeals more to the selfishness of human nature than to the principles of equity and justice. Municipalities *should* represent the true spirit of enlightened democracy, and one can find nothing in the principles of democratic self-government which can put equity and justice in the background as matters of comparative unimportance. It is perfectly true that in some cases municipalities do not own their tramways, but that is a condition of affairs which is altering year by year—where it will pay to acquire the system.

   Nobody can deny—in view of the acquisition of tramways by municipalities during the last decade or so—that the tendency is strongly in the direction of municipal ownership, and this tendency is likely to increase rather than diminish in the near future.

   But dealing with the question on its merits, we might repeat the old Latin phrase, "Let justice be done if the heavens fall," and although this is a contingency which may hardly be expected to happen, the sentiment is one which may well express the feelings of all just and upright men of sound judgment and reasonable opinion.

   With regard to the position of highway committees, any extra cost which might be involved in taking over part of the maintenance of the tracks would be met by the increased contributions to the rates which in most cases would be expected. But even if this result was not attained, the principle remains the same.
6. This objection is specious and unsound. To quote Councillor C. F. Spencer on a previous discussion of this question, "every tub should stand on its own bottom." Municipal trading has to undergo keen scrutiny and criticism on all hands, and perhaps rightly so. It is only equitable, therefore, that these concerns should be worked upon strict commercial business lines, and should not only be debited with every legitimate outgoing, but credited with every reasonable source of revenue. There should be no "lading and teeming" or "robbing Peter to pay Paul," but all municipal trading concerns should be conducted on lines of sound financial principles, and whether it be tramways, markets, water, or electric power, should show its actual losses or gains in its annual financial statement just as all great private companies do in theirs.

   It is no satisfactory answer to say "it makes no difference in the long run," because—*first*, the statement may not, and in many cases would not be true; and, *secondly*, the result does not show the real financial state of the undertaking.
7. The last objection has probably more to be urged in its favour than any of the others. But it would be difficult to estimate how much additional traffic is put on other streets in consequence of tramway traffic. Close observation in several towns has failed in most cases to show anything like a large percentage of displaced traffic, and it appears to have affected the sides of the tracks more in wide streets than to have permanently taken traffic altogether away from tramway routes.

*In conclusion*, assuming that the present application of Section 28 of the Tramways Act, 1870, is inequitable, what are the suggested remedies:

(*a*) Differential rating on the basis of one-fourth the net annual value, or

(*b*) The reduction of the cost of track maintenance to tramway concerns by one half, the local highway authority paying the remainder, or

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(*c*) By both "(a)" and "(b)."

(*d*) By the repeal of the exemption under the Finance Act, 1910, referred to previously, and the formation of a fund by which local authorities shall be allocated proper proportions of the yield of the tax towards road maintenance on tramway as well as other routes.

(*e*) By the repeal of the 5th Schedule, Part 1, of the Finante Act, 1910, except paragraph 4, thus allowing the rebate on petrol to medical men only, and the payment of the increased duty to the proposed fund referred to in (*d*) above.

The proposals (*d*) and (*e*) would then provide that those who mainly use the roads, or who chiefly contribute to their destruction, would then pay directly towards maintenance and renewals.

Whilst highway authorities are responsible for the general upkeep of the roads (except as exempted by Section 28 of the Tramways Act, 1870), it will be only reasonable that if the burden now placed on tramways is wholly or partly transferred to the highway authorities, there should—in view of the enormous change in the character of the traffic—be some relief from imperial sources. This principle is already recognised in the grants from the Road Board, but the amounts so allotted should be considerably increased.

These suggestions (whilst they do not by any means comprise all that could be advanced) are put forward, like the rest of the paper, with a view of providing an opportunity of discussing all sides of this debatable subject, and in the hope that it will lead to the satisfactory solution of a difficult problem which is daily becoming more urgent in its need for settlement.

My acknowledgments are due, and are gratefully tendered, to the following gentlemen for the valuable information supplied and the assistance given in the preparation of this paper: Messrs. A. R. Fearnley (President M.T.A.), Sheffield; A. L. C. Fell, London; J. Dalrymple, Glasgow; J. B. Hamilton, Leeds; J. M. McElroy, Manchester; W. J. Hadfield, Sheffield; H. England, Wakefield; A. de Turckheim, London; and W. H. S. Dawson, Bradford.

## AN EXPLANATORY NOTE ON THE CAPITAL COST AND MAINTENANCE OF PAVING IN THE TRAMWAY AREA.

The figures given in the table attached hereto represent the estimated saving to the road authorities (that is the Borough Councils) of London, owing to the tramway authority (that is the County Council) constructing and maintaining the paving and foundations of the tramway area.

The amounts have been obtained by estimating the debt charges on the cost of constructing the foundations and paving within the tramway area, based on the assumption that tramways did not exist and that the whole of the roadway was paved in the same form as the crests are at present. To this is added the cost of maintenance for each year.

The period of repayment for all foundations has been taken at 30 years. The life of granite paving has been taken at 20 years, and hard wood paving at 10 years. The area of each type of paving varies in the different districts. An average has, therefore, been taken of the whole system, which gives a figure for capital charges and maintenance of £875 per mile for electric traction, and £580 per mile for horse traction. The difference between these amounts is due to the greater length of single line on the horse car routes.

## APPENDIX "A."

### LONDON COUNTY COUNCIL TRAMWAYS.

Financial benefit conferred by tramways on road authorities as compared with motor omnibuses for the period of five years ended March 31, 1913.

TRAMWAYS.

| | Year. | £ | Totals. |
|---|---|---|---|
| Rate on tramways (*i.e.*, payment for the use of roads). | 1908-9 | 35,043 | |
| | 1909-10 | 43,904 | |
| | 1910-11 | 49,406 | |
| | 1911-12 | 98,526 | |
| | 1912-13 | 98,293 | |
| | | | 325,172 |
| *Maintenance and renewal of permanent way (*i.e.*, the estimated saving to road authorities owing to tramways). | 1908-9 | 93,738 | |
| | 1909-10 | 107,515 | |
| | 1910-11 | 118,000 | |
| | 1911-12 | 122,772 | |
| | 1912-13 | 125,486 | |
| | | | 567,511 |
| Total rates, renewals, etc. .. | .. | .. | £892,683 |
| Workmen carried at cheap rates | 1908-9 | 37,985,254 | |
| | 1909-10 | 46,298,889 | |
| | 1910-11 | 55,786,620 | |
| | 1911-12 | 61,019,740 | |
| | 1912-13 | 63,649,057 | |
| Total .. .. | .. | 264,739,560 | |

* See special note to Appendix "B."

MOTOR OMNIBUSES.

| | £ | Remarks. |
|---|---|---|
| Rates for use of roads | .. *Nil.* | N.B.—As regards the petrol tax paid in respect of motor omnibuses this may be regarded as a tax on power, and corresponds to the rates, etc., paid on the tramway power-station and sub-stations. |
| Maintenance of roads | .. *Nil.* | |
| Total rates, maintenance of roads, etc. .. .. | .. *Nil.* | |
| Workmen carried at cheap rates .. .. .. | .. *Nil.* | |

## APPENDIX "A1."

### LONDON COUNTY COUNCIL TRAMWAYS.

ESTIMATED COST OF TRACK REPAIRS (ELECTRIC TRACTION).

| Year. | Estimated cost of paving repairs. | Cost per car-mile. | Miles of single track. | Cost per mile of single track. | Unit cost of paving repairs. |
|---|---|---|---|---|---|
| | £ | d. | | £ | |
| 1908-9 | 31,353 | ·235 | 168·4 | 186 | 2/6 to 3/- |
| 1909-10 | 42,990 | ·261 | 223·7 | 192 | " " |
| 1910-11 | 49,605 | ·261 | 243·4 | 204 | " " |
| 1911-12 | 50,398 | ·248 | 258·8 | 195 | " " |
| 1912-13 | 58,334 | ·264 | 267·0 | 215 | " " |
| Average .. | 46,576 | ·254 | 232·5 | 200 | " " |

## APPENDIX "B."

### MANCHESTER CORPORATION TRAMWAYS.

| Year. | Maintenance of Permanent Way. | Cost of Maintenance per Mile. | Rates. | Contribution to Street Improvements. |
|---|---|---|---|---|
| | £ | £ | £ | £ |
| 1909-10 | 16,371 | 98 | 38,498 | 4,048 |
| 1910-11 | 17,499 | 104 | 41,313 | 4,064 |
| 1911-12 | 15,344 | 90 | 42,901 | 4,056 |
| 1912-13 | 15,169 | 87 | 44,244 | 5,115 |

NOTE.—The cost of maintenance includes, in addition to the ordinary paving repairs, the cost in connection with the packing of the rails and attention to the rail joints and minor repairs to the points, etc.

## APPENDIX "C."

### LEEDS CITY TRAMWAYS.

MAINTENANCE COST OF PAVING TRACKS.

| Year ended March. | Total Cost. | Cost per Route Mile. | Rates Paid. |
|---|---|---|---|
| | £ | £ | £ |
| 1911 | 20,305 | 355 | 21,123 |
| 1912 | 19,995 | 324 | 17,601 |
| 1913 | 25,415 | 414 | 19,809 |

No contribution towards cost of street improvements.

NOTE.—The difference in the amount of rates paid for 1912 is accounted for by credit brought into account of £3,522, being a provision made during the previous two years for an increase of assessment of a portion of the undertaking when, on objection to the increase, after negotiation, was reduced to original figure, and in the year 1913 provision was made in our Revenue Account for £5,350, pending appeal claiming assessment as a Light Railway.

## APPENDIX "D."

### GLASGOW CORPORATION TRAMWAYS.

COST OF PERMANENT WAY MAINTENANCE FOR THE LAST FIVE YEARS.

| Year ended May 31. | £ | d. |
|---|---|---|
| 1909 | 41,120 | ·474 |
| 1910 | 39,877 | ·456 |
| 1911 | 55,248 | ·611 |
| 1912 | 56,864 | ·608 |
| 1913 | 74,071 | ·762 |

## APPENDIX "E."

### BRADFORD CITY TRAMWAYS.

ESTIMATED COST OF REPAIRS TO THE PAVING.

| Year ended March 31. | £ |
|---|---|
| 1909 .. .. .. | 6,216 |
| 1910 .. .. .. | 6,683 |
| 1911 .. .. .. | 7,399 |
| 1912 .. .. .. | 8,775 |
| 1913 .. .. .. | 12,202 |

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## APPENDIX "F."

### SHEFFIELD CORPORATION TRAMWAYS.

APPROXIMATE EXPENDITURE FOR THE FIVE YEARS ENDED MARCH 25, 1913, ON THE UNDERMENTIONED ACCOUNTS.

| Year Ended March 25. | *Repairs Account. Paving only. | Renewals Account. Paving only where Rails not Disturbed. | Total. |
|---|---|---|---|
| | £ | £ | £ |
| 1909 | 4,826 | 1,294 | 6,120 |
| 1910 | 4,626 | 1,924 | 6,550 |
| 1911 | 4,611 | 3,804 | 8,415 |
| 1912 | 4,527 | 594 | 5,121 |
| 1913 | 6,115 | 4,681 | 10,796 |
| | £24,705 | £12,297 | £37,002 |
| Annual Average | £4,941 | £2,459 | £7,400 |

* Includes items returned as Packing and Paving. Excludes Renewable Plate Work, Fixing Anchors, Winby Chairs, Galloway Joints, etc.; Relieving Drain Rails, Corrugations, Items charged to Repairs for changing Fittings, Rails and Castings.

COST OF LOCAL RATES ON PERMANENT WAY.

| Year Ended March 25. | Amounts Paid to Sheffield and Ecclesall Townships. | Amounts Paid to the Handsworth Urban District Council. | Totals. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| 1909 | 9,475 12 10 | 11 15 0 | 9,487 7 10 |
| 1910 | 10,428 5 9 | 23 19 8 | 10,452 5 5 |
| 1911 | 10,461 7 5 | 56 10 3 | 10,517 17 8 |
| 1912 | 10,528 0 0 | 69 1 5 | 10,597 1 5 |
| 1913 | 7,048 1 0 | 41 13 5 | *7,089 14 5 |
| Totals | £47,941 7 0 | £202 19 9 | £48,144 6 9 |

* In consequence of the recent decision of the House of Lords, this amount will be increased during the present half-year by £2,105, or at the rate of over £4,000 per annum.

## APPENDIX "G."

### YORKSHIRE (WEST RIDING) ELECTRIC TRAMWAYS.

ROAD MAINTENANCE.

| Year. | Cost of Maintenance. | Per Mile of Single Track. | Cost of New Paving. | Per Mile of Single Track. |
|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| 1907 | 2,454 6 9 | 60 15 7 | .. | .. |
| 1908 | 2,931 1 1 | 72 11 8 | 2,000 0 0 | 49 10 6 |
| 1909 | 3,168 1 1 | 78 9 0 | 2,500 0 0 | 61 18 2 |
| 1910 | 3,280 9 5 | 81 4 8 | 4,500 0 0 | 111 8 8 |
| 1911 | 3,556 2 6 | 88 1 3 | 599 9 11 | 14 16 11 |
| 1912 | 5,031 14 0 | 124 12 0 | *14,727 11 3 | 364 14 1 |

| Year. | Cost of Maintenance and Paving. | Per Mile of Single Track. |
|---|---|---|
| | £ s. d. | £ s. d. |
| 1907 | 2,454 6 9 | 60 15 7 |
| 1908 | 4,931 1 1 | 122 2 2 |
| 1909 | 3,668 1 1 | 90 16 8 |
| 1910 | 7,780 9 5 | 192 13 5 |
| 1911 | 4,155 12 5 | 102 18 2 |
| 1912 | 19,759 5 3 | 489 6 2 |

RATES.

| Year. | Local Rates Paid. | Per Mile of Single Track. |
|---|---|---|
| | £ s. d. | £ s. d. |
| 1907 | 451 8 9 | 11 3 7 |
| 1908 | 470 14 11 | 11 13 2 |
| 1909 | 525 2 7 | 13 0 1 |
| 1910 | 536 18 1 | 13 5 11 |
| 1911 | 540 6 4 | 13 7 7 |
| 1912 | 519 9 5 | 12 17 3 |

* As regards road maintenance, most of our track was coated with macadam, and the large sums expended show the yearly maintenance of macadam. Last year we resolved to pave entirely between the running rails with granite setts, and you will see that we have expended over £14,000 on this. We are completing the work this year and expect to spend another £18,000 on paving.

## APPENDIX "H."

STATEMENT SHOWING LOCAL RATES AND REPAIRS OF PERMANENT WAY PAID BY 34 TRAMWAY COMPANIES, 1912.

(Supplied by A. de Turckheim, Esq., Secretary, Tramways and Light Railways Association.)

| Letter. | Miles of Single Track. | Cost of Repairs & Maintenance. Permanent Way. Total. | Cost of Repairs & Maintenance. Permanent Way. Per Mile of Single Track. | Cost of Rates. Total | Cost of Rates. Per Mile of Single Track. |
|---|---|---|---|---|---|
| | | £ | £ s. d. | £ | £ s. d. |
| A (32 Companies) | 578·95 | 66,840 | 115 9 0 | 35,860 | 72 0 0 |
| B | 100 | 12,132 | 121 0 0 | 16,067 | 160 10 0 |
| | | 22,563 (renewals) | 225 0 0 | | |
| C | 28·7 | 1,715 | 59 15 0 | 4,617 | 160 17 5 |

## APPENDIX "I."

RATING AND PERMANENT WAY CHARGES ON TRAMWAYS.

Amounts paid on 16 Corporation tramways for rates and repair and maintenance of permanent way, based on a report appearing in the July 11, 1912, issue of THE TRAMWAY AND RAILWAY WORLD.

| Tramway. | Total Amount of Rates paid on Permanent Way. | Total Amount of Repair and Maintenance of Permanent Way. |
|---|---|---|
| | £ | £ |
| Ayr .. .. .. .. | 549 | 2,140 |
| Birkenhead .. .. | 1,384 | 5,477 |
| Brighton .. .. .. | 748 | 5,501 |
| Burnley .. .. .. | 2,969 | 1,558 |
| Bury .. .. .. | 880 | 1,562 |
| Glasgow .. .. .. | 49,011 | 55,289 |
| Halifax .. .. .. | 1,914 | 7,067 |
| Keighley .. .. .. | 153 | 295 |
| Leicester .. .. . | 3,617 | 5,076 |
| Leith .. . .. | 286 | 850 |
| Manchester .. | 42,536 | 17,355 |
| Northampton .. .. | 586 | 486 |
| Salford .. .. .. | 7,205 | 3,025 |
| Sheffield .. .. .. | 10,528 | 24,756 |
| Walsall .. .. .. | 801 | 1,271 |
| Warrington .. .. | 620 | 876 |
| Totals .. .. | £123,787 | £132,584 |

## DISCUSSION ON COUNCILLOR FENTON'S PAPER.

Councillor C. F. SPENCER (chairman, Halifax Tramways Committee): The paper which Mr. Fenton has read to-day is an exceedingly comprehensive, lucid, and yet concise one. I remember once walking on Blackpool sands, and hearing a scissor-grinder indulging in the vernacular, and he said, "I come from a place where they settle their differences with half-bricks." I said "Where is that?" He said "Sheffield." (Laughter.) On this occasion Mr. Fenton has settled the question, to my mind, with whole bricks, and he does not give much opportunity to anybody to put the lime in between them. For the last eight years the Halifax Corporation Tramways Committee have considered this question very seriously, and perhaps after a few discursive remarks from me you will see we have reason to complain, and I am sure we, more than anybody else perhaps, are indebted to Mr. Fenton for the excellent paper he has submitted this afternoon. He has first explained the injustice of the section to which he has referred in the Act of 1870. He has explained the necessity for revision and the objections to revision, and then he has answered these objections. If ever there was ninepence for fourpence, he has given it to us this afternoon. (Laughter.)

To my mind this subject should be looked at from the business standpoint. It is not a question of how many Corporations have company tramways running through their district, but a financial question which should be determined from a purely business standpoint. There are many of us, I have no doubt, who—if we had company-owned tramways in our districts and looked at it from the point of view of the local exchequer—would say "We do not want any alteration;" but I venture to assert that, in these days of enlightened democratic government, if municipal tramway undertakings are to be accepted and to be a success, we ought to have our accounts placed on the most satisfactory financial basis possible, so that they would bear the keenest and healthiest criticism. That can only be done by each department realising its responsibilities, and the Council dealing with these things, not from the point of view of the exchequer, but entirely from the trading point of view.

What are the difficulties which beset us in a tramway department? First of all, we are rated at full. I see Mr. Fenton says: "When is a tramway a light railway?" The only answer is, "When it pays rates on one-fourth." What is the basis of the rating of tramways? I

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venture to say that the basis of the rating of tramways is different from most municipal undertakings. We are rated on the ability to pay. If you are making a high profit your assessment goes up. If you are making a small profit, you try and get it down. But if a man owns a warehouse, and employs forty or fifty motor vehicles to distribute his goods, and in one year makes £500, and in the next year £10,000, the basis of the rating is not altered at all. But the basis of the rating of your trams, if you double your profits, is considerably increased, and consequently you are taxed on your ability to pay. That may be theoretically wrong, but in practical effect it is right. That is what is happening to all of us to-day; at any rate, to the Halifax Corporation, and I do not suppose there is any other authority better off than we are.

We want a revision on this question of rating. What do we pay rates for? For the right to run our tramways in one street only! The motor omnibuses pay no rates at all, and they have the right to run in any street, and although the competition does not affect us in Halifax, the fierce and unrestrained competition which the local authorities in London are meeting from motor omnibus systems is a matter which this Conference ought to take into account, and do everything they can to assist the London local authorities. (Hear, hear.) The London local authorities have to pay rates for running one way; the motor omnibuses go anywhere and pay nothing at all. Why should not the motor omnibuses be taxed on their ability to pay, and according to the amount of their receipts as a basis in the particular district in which they run? I think the local authorities are entitled to this, and ought to get it through, but we shall not get it out of this Parliament, because they have more things to do than look after local authorities. (Laughter.)

Then what about maintenance of track? Let me give our own tramway as an example. We are told we ought to maintain the highways because we mostly use them, and also because other vehicles have to take deviation routes. Our streets are very narrow, and we have double lines as frequently as possible, because we are advised it is best for the traffic generally to put down double lines where possible. We have carried through that policy, and with what result? That in some of our narrow streets we practically have to pave the whole of the road. The tramway authority has to pay for the paving of the whole of the road. Private motor cars do not contribute a penny; ordinary motor vehicles which deal with trade do not contribute anything, and the ordinary horse-drawn vehicles contribute not one iota. You may say, "Those people pay a portion in our rates;" so do we pay a portion in our rates for our tramway sheds, but I venture to say it is not right that the whole of the incidence should fall on us. It should be fairly distributed.

The only way I can suggest in which it should be distributed is that the tramway authority should bear the cost of paving and renewals for 9 in. on either side of the line, and the highways authority should charge them a mileage rate for it. What happens in our case? The Highways Committee select the granite setts or the Yorkshire stones and the cement, and find the men to carry out the whole of the work. Then they measure it up, send in their account, and we sign cheques for it, though we have no control over it at all. That is our position, and one to which we are compelled to submit. The Council says, "This is the highway authority; there is the section of the Act of Parliament, and we have to carry it out." We have no voice in the management, no control over the material, nor the manner in which it is laid. All we have to do is to sign our monthly cheque as they send in the invoice to us. That shows what a live business Corporation we are at Halifax. I would go one further and say that a chauffeur or driver of a motor vehicle would prefer to drive over the tramway track to driving on the road where there is a sufficiently wide road to do so, because it is better paved. The Highways Committee look after our paving very well. The driver also says, "I am much more secure here; there is less liability to accident in the centre than on the side of the road."

What are the Road Board doing? They are investing their funds, not for us, but for posterity. The Government looks always after posterity, I suppose because they have done so much for us. (Laughter.) They have invested something like three millions of money. Would it not be a charity if they could hand over three millions to us? We could spend it for them, and show them how to maintain tracks and roads. I do not think the Road Board are working on a right basis. If the income from the petrol tax or anything else of that character is to be rightly distributed, it should be distributed to the local authorities who know what is wanted in the districts, and not held up in London, and left to the chairman and officials of the Road Board to invest in Consols. It is all right for keeping up the price of Consols, but it was never intended for that; it was intended to help the local authorities. As to the distribution, what would be the basis of it I cannot say, but anybody who can create a national insurance scheme can deal with the very simple matter of how to deal with this fund.

What attitude does the Council take to the tramway department? When I read THE TRAMWAY AND RAILWAY WORLD and similar journals at the end of March, or at the time when estimates are being made, I find that the local exchequer looks upon the tramway department, if it is a financial success, as a sort of bank, upon which it can draw in case of need. In Halifax that need is always chronic—(laughter)—and the chairman of the Finance Committee naturally always finds a way of dealing with any surplus which the Tramways Committee may have; and I venture to think all of you are in the same boat, even including Sheffield. In our great cities, such as Leeds and Bradford, they have huge profits, and they do not miss £10,000; but we in Halifax think £10,000 is a gold mine. Out of our capital outlay of £413,000 we have repaid £114,000 by the operation of the sinking fund, and we have a renewal fund of £27,319, but that is not sufficient to deal with all possible renewals. When a track has been down for fifteen years, you want a huge fund to renew it. You want to renew the paving and the rails, and I venture to say that this policy of the exchequer nibbling at your funds is one which is not going to assist small undertakings like ours. We pay in rates £3,250 a year. It may not be a big figure when you consider that our profits are anything from £12,000 to £18,000 a year. Then we pay in road paving £5,000 a year, and we give in relief of rates—or, rather, we do not give it; it is taken from us—£7,181, which comes out of our banking account. The result is a total of £15,431, which is actually disbursed to the local authority out of our income, representing 15 per cent. of our total. I can imagine somebody may say, "Why are you so foolish in giving this £7,181?" (Hear, hear.) You forget the old motto, "Good Lord deliver us!" (Laughter.) If you were at Halifax, you would know what we have to deal with. We have no option. They set up the basis, and many towns are setting up the basis, that you have to pay 1½ per cent on your capital outlay.

A DELEGATE: Quite right.

Councillor SPENCER: But what if you have not got that 1½ per cent. to pay? I agree with some percentage being given to the local authority, because we use their credit and borrow more money by having the credit of the Corporation behind us, but do not let us forget that we pave the roads, and we are yet called upon to pay 1½ per cent. on our capital. Is the value of the money worth 1 per cent. to us? I venture to say it is a hypothetical basis, but if it is worth 1½ per cent. on the capital outlay, why should it not be the reduced capital outlay and not the original capital outlay? Why should we have to pay next year 1½ per cent. on the debt which we have redeemed? We have redeemed £114,000, but because the exchequer wants the money we have to pay 1½ per cent. on the £114,000 actually redeemed and the loan discharged, and that is supposed to be fair trading. If you take the rating, our rates have gone up this year to £3,990. That is not on account of the recent decision, but because our assessment has been increased much; because we are making greater profits than we used to do. You are told you ought to pay for road improvements. Why should the tramways department pay for the road improvements any more than motor vehicles or a hansom cab? We pay for the right to run, we repair the roads over which we run, and hand over the profits. The £7,181 which we hand over is equal to 4½ per cent. interest and sinking fund, on £160,000, and £160,000 in improvements goes a long way in our town. Do they forget what the tramways have done? As Mr. Fenton said, they open out new districts and bring in new rateable values. We are not like Blackpool; they have a special front to run on. We in Halifax cannot afford a special roadway; we have to open new districts and bring about an increase of rateable value. We heard at lunch time of the housing difficulty which the tramways help to solve, and I venture to say the housing difficulty has been partly solved in our town by taking the people into the country districts. We have cheap fares, and men can go back home at noon and get a dinner at home instead of having to pay for it in town. Tramways have enabled men to live outside the town instead of in the squalid centres. What is to become of your garden city schemes if you are not to have a tramway near? A tramway is one of the adjuncts to garden city schemes. Then we take half the output of the electricity works, and pay 1/8d. a unit for our current, and the manufacturers get it for a halfpenny.

How are these things to be remedied? I have some sympathy with the Corporation which says, "We must have as much profit from the tramways department as possible." I have some sympathy because Parliament is putting on us national impositions which have reached the breaking strain, but the time has come when local authorities should resist these impositions. How are we to resist them? You go to your own member of Parliament—I am not speaking of my own—and begin to discuss these things with him. He says it is only taking it out of one pocket and putting it in the other, and that it amounts to the same thing. I venture to say it does not, and your town members do not appreciate the work which is being done by municipalities. Perhaps, if they do appreciate it, they are not so assiduous in helping municipalities as they ought to be, and we know county members are antagonistic to local authorities.

The only way is to have a sort of municipal Parliament, a scheme similar to the British Association, with a central executive committee which represents every organisation connected with municipal work. If you had a big authority like that, which met one week in the year and discussed all these matters with all the weight of municipal influence, an association of that sort would make itself felt in Parliament; and when we show Parliament that we are united, and are all

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intent on having an alteration in the law, then Parliament will move; but so long as one is quarrelling with the other as to the right thing Parliament will not take the slightest notice of us.

I think the paper submitted by Mr. Fenton is one of those practical papers which should help us to come to a decision in this matter, and when we come to that decision, we ought to stand loyally by it, and do our best to get a remedy. (Applause.)

Mr. R. W. SMITH-SAVILLE (borough engineer, Darwen): After Councillor Spencer's speech I almost wondered at anyone (unless either a tramways manager, or at least a member of a tramways committee) having the temerity to venture along a public highway if it contained a tramway, for according to his views it appeared to have the monopoly of right there, and everything else must give way to it; certainly the Highways Committee, to whom legislation had given the administration of the road should have no authority there. Now we all know that tramways spend a big sum on the maintenance of track. In Darwen we are on the heaviest motor traffic road in Lancashire, between the busy manufacturing centres of N.E. Lancashire and the Manchester Ship Canal Docks, and although ours is not the nearest route to the Liverpool Docks, the bulk of the heavy motor traffic comes our way because the roads are better. Twelve years ago we had steam tramways (single track only), and our main road then cost us £342 per mile. Now, although the tramway track has been doubled for its entire length, the road costs us £891 per mile. This is entirely due to the advent of heavy motor traffic, so that notwithstanding that the tramways are now responsible for over double the paving area previously the highways cost has been increased almost three times, so that tramways do not appear to have relieved that department much.

Now take the case of the tramways, formerly in the days of the old steam traction with heavy engines the cost was £70 per mile of single track, when electric traction was introduced the lines were relaid, and after six years with ordinary traffic the cost was £59 per mile, with the introduction of heavy motor traffic it jumped to £80 per mile. It has increased annually until for the present year it is costing nearly £200 per mile, and if the repairs were not under the borough engineer it would cost more, in fact the cost is such an awful lot that one is ashamed to send the bills in. The impression seems to be, according to some, that when the borough engineer has nothing else for his men to do he sets them on tramway work to find them employment; but I assure you he has of necessity often to keep men there when he would much rather they were elsewhere. I admit that the tramways paving is in a better state of repair than that outside—and this must be so, for the reason that it is alongside the rails themselves. We are satisfied that if we do not keep the paving in a high state of repair we shall get our rails and joints broken by the heavy motor wheels coming across and striking them like a sledge hammer, therefore, they must not be left projecting.

With ordinary highway paving you can afford to lose some of the camber, because its level is not fixed by that of the rails, and you do not have traffic running on defined lines and making tracks of its own, but where tramway lines are, especially if double, the traffic follows not only against the rails but on defined lines between them and the kerb, and the natural tendency of horses—and I drive 10 miles a day—is also to follow on the defined lines set by the rails or the space between the rails and kerb, so that certain narrow portions of paving get undue wear, and if left would form hollows; this causes excessive cost to both departments. I do not think there would be cause to complain of the ordinary traffic if it were not for the heavy motor traffic, and I think a resolution passed by the Conference should be sent to the Chancellor of the Exchequer and the President of the Local Government Board, protesting against the maintenance put upon us since the heavy motor traffic came into use, and urging that we should have some special grant from the Exchequer.

The MAYOR OF ROCHDALE (Alderman Wm. Cunliffe): I thought Mr. Spencer covered a very wide area in opening this discussion, and he introduced some problems which could very well be relegated to the Municipal Corporations Association in London, instead of this Conference being called upon to deal with them. I think you have a very contented Tramways Committee in the Halifax Corporation, and I wish to ask whether, instead of sticking to the strict Act of Parliament, there is not some arrangement which could be made between the Paving Committee of your Corporation and your own Tramways Committee with relation to the paving which is needful owing to wear and tear of the track. We have exactly the same difficulty in our own Corporation; but we have made arrangements with the borough surveyor and our own manager to see what portion of the track calls for repairs, and when both are agreed, then the Paving Committee furnish the new setts without charging the Tramways Committee with the cost. The putting down of the new setts, and reinsertion of the old ones, and making the paving good again, will be charged to the Tramways Committee. This arrangement is working very amicably between the two committees, and I have no doubt such an arrangement might be made by the Halifax Corporation itself.

Mr. Spencer asks why the motor vehicle should not pay for the improvement of the road and the widening of the road? Do not the motors pay by the petrol tax? (Cries of "No.") I had occasion lately to interview Sir George Gibb of the Road Board concerning matters in our own borough, and he generously met us with a handsome contribution towards improvements we needed, which will usefully serve our tramway purposes as well as all other vehicular traffic on the roads. The great point is that the Road Board are assisting county authorities very largely. Since this budget was passed by the Chancellor of the Exchequer, they have disbursed large sums of money to the county authorities, and are now recognising county boroughs, and large sums of money are being voted for the permanent improvement of the roads which is rendered necessary by this heavy traffic which now uses them.

The DEPUTY MAYOR OF CROYDON (Alderman J. Trumble, J.P.): I should just like to intervene for one moment in the discussion. Reading the paper by Mr. Fenton, it seems to me we have to consider—rather than the particular affairs of Halifax or the town which our good friend who has just spoken represents—the broad principle as to the repairing of the tramway track and who is to pay for it. The matter, as far as I understand the paper, is rather a disagreement between the tramways management and the highways department. Even that you can reply to by saying that the local ratepayer—not the taxpayer generally, but the local ratepayer—is not particularly concerned in regard to that. Of course, as a business undertaking, no doubt we should see to it that everything possible should be placed to our credit, and that every possible charge wrongfully put upon us should be removed. At the same time it would not really affect the ratepayers of our towns whether the highways department paid for the maintenance of the track between the lines, or whether it was paid out of the revenues of the tramway department. When we have a profit, the Finance Committee take it; it is only taking it by a roundabout way from the highways department. The other alternative is that you can equalise matters by taking away the charge, or putting a tax on other vehicles. Motor 'buses seem to be in the minds of some gentlemen here. If you tax the motor 'bus, that would equalise matters to some extent, but there again you would have exceedingly great difficulty. Taking the place I represent—Croydon—where we are feeling motor 'bus competition in a very severe form. When you begin to talk about taxing motor 'buses you are up against a very big proposition indeed. It is a very difficult problem. Why should we tax the London General Omnibus Company's motor 'buses, if we do not tax the motor vehicles of Harrod's Stores, the Civil Service Stores, and every other stores in London? Then, if we tax them, why not tax every trader in our town? We have these difficulties to face, and it seems to me if you are to tax vehicular traffic, the only way is to go back to Lord Goshen's wheel tax, and tax every wheel on the road, and then you would have a fair proposition. Although in Lord Goshen's day it was withdrawn, perhaps to-day it would be acceptable, but I hope we shall try to discuss it as a matter of principle. As far as I know, it is not worth discussing as a matter between the Tramways Committee and the Highways Committee, because the money comes out of the pocket of the local ratepayer. It would be preferable to discuss whether it is better to equalise things by taking the rate off the tramways, or putting it on to motor 'buses, as the case may be. It is a very difficult problem, and I am sure this Conference would do well to discuss it on broad lines.

Bailie ALSTON (Glasgow): I agree entirely with the last speaker. It is not a question between various committees of a Corporation that we are here to discuss, but the general principle as to where taxation ought to be placed, and I think every business man to-day differentiates between a concern which earns its revenue in the streets or highways, and a concern which merely uses the highways for the conveyance of merchandise. I think there is a difference. In the one case it is essential to the company earning its revenue; the roadway is just as essential as the 'bus or motor itself. (Hear, hear.) That being so, there is a difference between them and the wholesale firm of merchants who only use the road for the transport of goods, and who may be rated at a very much bigger rate on the premises they occupy than the premises that shelter the 'buses over-night.

From that point of view, I think we are entitled to expect some differentiation in the rating of those 'buses. A friend of mine, who is living in Essex, told me that they have cut up the roads round his district to such an extent that the local ratepayer is practically refusing to pay rates, saying they are cutting up the roads without paying a single penny to the rates. That ought not to be, and there ought to be some means of getting at these people and making them pay a fair proportion towards the maintenance of the road. The tramway department has to do that, and pay the full value. I know in Glasgow we have to pay something like £67,000 per annum for local rates, and maintain the roadway over and above that. If a 'bus company came, what they would pay upon would be the places they shelter the vehicles in. We should have to maintain the streets they used and got the profits out of.

But there is another aspect in connection with the 'bus traffic in large centres of industry, which has not been touched upon to-day, and which I think ought to be noted. Not only do they use the highways for the accumulation of wealth, but they use them in a very reckless and dangerous way—dangerous to the public safety. I venture to say

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they are becoming more dangerous each day almost. Mr. Fell, I imagine, could inform us of that. I find in a return I have in my hand that within five years the deaths or fatalities from the London 'bus have doubled. I find that in 1907 there were 1,200 'buses in London; they killed 35 people, which is equal to one for every 34 'buses. But in 1912, we have 2,400 'buses, killing 138 people, or one for every 17 'buses. That is not all. Comparing the rate with the tramways in London, we find that the London County Council tramways carried 821 million passengers in 1912, and that their death roll from fatalities by accident was 34, which means a fatality for every 24 millions of passengers carried. The London 'buses in the same period carried 400 millions and had one fatality for every 3½ million passengers carried. That is a point of view which I think local authorities, and all interested in humanity apart from the question of gain, ought to consider, and see that it is put a stop to. Not only should we make them pay more, but see that they are conducted in a less reckless fashion. These 2,400 'buses only carried 400 million passengers, but what a congestion to carry that number. Our vehicles in Glasgow, 800 in number, carried 311 millions in the same period, and there was less congestion from the 800 vehicles than the 2,400. Then we come to another point. We are practically losing control of our highways, and so congesting them that they are becoming dangerous, and the sooner the local authorities take control and run the 'buses, if they are to be run, the better it will be for all concerned.

Mr. J. B. HAMILTON (general manager, Leeds Corporation Tramways): I think perhaps there is rather a difficulty in the minds of some of the members present in keeping within the limits which Mr. Fenton has set in his paper. In listening to the last speaker I was tempted to think that I had overlooked something, and that he was speaking on the paper which I shall have the honour to put before you to-morrow. I think after all it is a comparatively narrow matter—the incidence of rating upon tramways and maintenance of roads. It must be looked upon, I think, in some degree as a rental which is paid. Remember, this was not done yesterday. The Tramways Act was dated 1870, and whilst, as properly said by the writer of the paper, undoubtedly the question of road surface wear was in the minds of the legislators who framed the Act, when the change of traction came—which again in most cases was the subject of Parliamentary powers granted—the charges were continued, and I think it is somewhat late in the day—43 years ago now—to find that we have a tremendously unfair burden. It must be remembered after all that the tramways have got along with that burden, and I think practical men cannot dissociate from their minds the fact that a good deal of extra road wear does result from the presence of the rails.

I agree with a good deal that has been said as to the necessity of setting matters right. There is an inequality of conditions throughout the country where the heavy petrol and steam motor traffic is developing—inequality which, I think, forces upon us the necessity of considering what is fair to be paid by those using rail transit and those using the road generally. The urgency of this question is being focussed to the necessary point. Several times this matter has been brought forward by members of the Association; in company with my colleagues the members of the committee, we have considered it very fully. Until the frequency of these heavy vehicles became so pronounced, I think we all felt the matter largely academic, and we came to the conclusion that we should be driving a wedge between different municipalities with varying conditions in cases where we desired to have perfect unanimity of feeling, and we thought there was no necessity at that time to push the matter further forward. But I do agree that things have completely altered. In my own experience I have reports nearly every day from our permanent way engineer of shattered paving such as never occurred five years ago, and which is directly traceable to the extraordinarily heavy wear of many of our streets. I think it would be very advisable that this Association, whilst not passing a definite resolution, should make it clear that this question of the maintenance of paving which is placed upon tramway promoters should be considered along with the wider question which the late Conference—I think in June—placed upon the Executive Committee: that was, that having in view the inequalities in the incidence of taxation which were taking place all over the country as the result of the change of the methods of traction and the vehicles using the roads, the Executive Committee should be empowered to take action, in conjunction if possible with other bodies, so that a national and united effort should be made to place the matter before Parliament in such a form as would enable it to come under revision. The result of to-day's discussion should be, I think, that road maintenance as in Section 28, should become one of the matters included in the general resolution, and I should like to suggest that should be done.

Judge HALL (Leith): I think in the Act of 1870 we have authority to agree with the local authority to go in for the joint expense of repairing the roadways. In section 29 it says.

> "The road authority on the one hand and the promoters on the other hand may from time to time enter into and carry into effect, and from time to time alter, renew, or vary, contracts, agreements, or arrangements with respect to the paving and keeping in repair of the whole or any portion of the roadway of any road on which the promoters shall lay any tramway, and the proportion to be paid by either of them of the expense of such paving and keeping in repair."

If the road authority and the tramway committee are in agreement there is no reason why there should not be a friendly settlement of the matter under the Act of 1870. The Leith Tramway Committee only pay two-fifths of the road expenses. They pay for the whole of the rails and for iron track protectors, but the road authority pays for the granite setts, and we think that is equitable, because there is a very large dock traffic in addition to the general traffic of the town, and the Town Council think that the Tramway Committee should only pay two-fifths and the Road Committee three-fifths. In this very Act there is authority to make such an agreement ——

The PRESIDENT: Do I understand you to say that the road authority pay three-fifths of the cost of paving between the tramway track?

Judge HALL: We pay two-fifths and the road authority three-fifths.

The PRESIDENT: Of the paving between the tramway track?

Judge HALL: Yes, and I think there is no reason why the authorities should not agree together under this Act.

Mr. W. J. SQUIRES (London County Council): I am sure the Conference will forgive me if I do not divulge very much what is the feeling of the London County Council. While I admit it is rather a difficult position here in the provinces, in London we are confronted with something like 28 borough councils, and you will realise what is our position. It is very difficult indeed to confine this discussion to the paper which has been read. I desire to thank the reader of this paper and the opener of the discussion if only for one thing. There is a very strong touch of sympathy from this Conference with the Council which I have the honour to represent. I am of opinion that when we get the report of the Traffic Commission—I admit that only deals with London traffic for the presnt—but I do believe when we get that report, and when it is discussed by the London County Council there will be food for all the tramway undertakings of this country, and I am sure this Conference will express the hope with me that the result of that inquiry may be satisfactory.

As to the contribution to road maintenance—and here I only express my own opinion; I am not permitted to express the opinion of my Council—my opinion is this, that since the motor 'buses are doing as we are doing as a tramways undertaking—that is, endeavouring to supply the wants of the public, catering for the public and taking their fares, and making profits—they should contribute in some portion as we have to on the London County Council. (Hear, hear.) Of course there is a difference between the provinces and London. You are not confronted with that terrible opposition—I will not say "opposition," I would rather say "competition"—that we have from the motor 'buses, but surely if we have to pay because we are taking the public money, the motor 'bus company should pay because they are also taking the public money.

One of the delegates made a suggestion that if we did this we ought to tax Harrod's and the Army and Navy Stores, and such like, but may I draw this distinction? Messrs. Harrods are not catering for carrying the public, but the motor 'buses are, and they are carrying the public, and I venture to think that any reasonable man will be prepared to say that, not only in London but in the provinces, any competing authority who is catering in the same way as themselves should pay their fair contribution. In other words, may I say I honestly believe that with the tramway undertakings of London and the provinces given the same conditions as the motor 'buses are allowed to run under, we shall hold our own for all time.

The difficulties we have to encounter are very great indeed, and nobody knows them better than my chief officer, Mr. Fell. May I, in conclusion, say how pleased I am to be here, a representative of the London County Council in Sheffield, and to congratulate Sheffield on what I have seen. There is one other reason, and that is that Sheffield gave to us our chief officer, Mr. Fell. (Hear, hear.) I do not intend to say anything more than express my own opinion on one or two points, but I do honestly believe that when this report is fully discussed there will be something more for all concerned in tramway undertakings. (Applause.)

Mr. H. MOZLEY (manager, Burnley Corporation Tramways): Do I understand, Mr. Fenton, that you wish to put on motor omnibuses and motors generally a further tax beyond the £40 you estimate, because it represents about the sum per car for the maintenance of the tramway, and rails, and points and crossings? Would it not be better to get the £40 for highway purposes instead of letting the Road Board have it? The other portion of the paper, as to the maintenance between the Tramways Committee and the Highways Committee, I think is purely a domestic matter, and can be dealt with without going to Parliament, as has been proved by our friends from Rochdale and Leith.

The PRESIDENT: We have some visitors from the Tramways and Light Railways Association, who are very much interested in this question, though perhaps in a different way from the Municipal Tramways Association. If those visitors would like to express an opinion on this paper, we should be very glad to hear them.

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Mr. H. M. SAYERS (Tramways and Light Railways Association): I am sorry Mr. England is not here at the moment, as he has had more experience than I have had recently. I have been in South America for the last three years, where the conditions are very different from those in England. There tramways are rather welcome, and although local authorities who give the concessions like to make a fair revenue out of us, that revenue is stated in our contract when we start, and we can take it or leave it as we like; we have nothing to grumble at afterwards. We do not pay for track repairs as a rule, though different concessions and contracts vary somewhat.

But as representing the Tramways and Light Railways Association, which has most of its members in tramway companies, I can say we feel this matter very keenly indeed, and as you can imagine by the way in which, with the assistance of the Association of Municipal Corporations, we organised the fight for the rating of tramways on the one-quarter rate basis, we are very much in earnest on the question of rating. Of course, we cannot expect municipal Corporations to take exactly the companies' point of view, but we hope you will fight the fight of tramways as tramways, because after all the fair working of tramways is a matter of public importance, and not only a matter of dividends or relief of rates. It is much more important that the public should have good tramway services, and that tramways should give the best possible service for alleviating the difficulties of density of population and other things of that kind, than that shareholders should make large dividends, or ratepayers get large relief of the rates.

On the question of rating, it was suggested by Mr. Spencer, I think, that tramways are almost the only concerns rated on the revenue basis. That is not quite the case. Besides tramways, there are gas undertakings, electric supply undertakings, water supply undertakings, and railways, which are rated on much the same basis, and I should like to point out that they are rated on this basis because it is on the rent that the hypothetical tenant would give for the hereditament, and it is in the hereditament that the trouble lies. It is suggested that motor 'buses should be rated, but they are not hereditaments and are not attached to the soil, and to get powers to rate motor omnibuses means that the whole basis of rating has to be revised and altered. That goes back to Acts of Queen Elizabeth's date, and it is a very difficult matter.

As regards maintenance of track, I do not see why tramways should be put under the injustice of the maintenance of paving besides their own rails. They do not wear anything but rails, and as to the suggestion of the imperfect joints between the paving setts and the rails putting larger wear on the paving, I think that is really a matter of the proper choice of material and workmanship. The attention the tramways undertaking have to give to the joints, the bonding and the substructure, ensures ample opportunity for making good after repairs.

Mr. H. ENGLAND (Tramways and Light Railways Association): Before speaking on Mr Councillor Fenton's paper, I should like to take this opportunity to thank you, Mr. President, for so kindly inviting me to be present at this Congress. I appreciate the compliment very deeply, and I can assure you I am delighted to have the opportunity of meeting my old friends and participating in your deliberations. Although Mr. Fenton states in his paper that Section 28 of the Act of 1870 has been discussed by the Tramway Associations on many previous occasions, still I do not think it is necessary for him to offer any apology for urging the attention of this Congress to what is becoming—nay, has become—a very serious and burning question. Owing to the rapid growth of heavy mechanically-propelled vehicular traffic, road maintenance charges are growing by leaps and bounds, and it is quite time we sought some measure of relief from the iniquitous burden imposed on us by this section of the Tramways Act. In other places I have stated my opinions on this question, and this morning I wish to urge this Congress to take a wider outlook. I think we cannot expect to secure any amendment to Section 28 without a general overhaul of the Act of 1870, which has by usage come to be regarded as the tramway charter, but which, under modern conditions, is in many respects quite obsolete, and which strangles the industry it was designed to encourage.

There are many other clauses, in addition to Clause 28, which should, in the interests of tramways generally, be amended. What many of us ask for is the amendment of the frontagers' veto, the amendment of the rating provisions of the Act, and the establishment of a permanent tribunal, composed of men having practical knowledge, to adjudicate upon all traction schemes, and report the result of their deliberations to Parliament. We want to be able to promote schemes more than once a year, as at present, and I see no reason why we should not be able to submit a scheme at any time, and thus save what often now amounts to the loss of many months. We want the Acts of 1870 and 1896 consolidated, the procedure cheapened, simplified, and accelerated, and if this were done I am quite sure there are many miles of route, at present not served by tramways, which could be equipped, and would be undertaken if it were not for the obstacles put in the way by the present tramway and light railway enactments.

The Tramway Associations meet every year in conference, and each year reference is made to the unsatisfactory state of the law, but, the conferences over, nothing further is done. If I were a member of this Association, Mr. President, I should move that it be an instruction from this Congress to the Executive Council to take steps as soon as possible to consider this problem, and to prepare a bill embodying all necessary amendments of the Tramways Act, 1870, and of the Light Railways Act, 1896; to consolidate the two Acts, and make provisions for the inclusion of clauses governing motor passenger vehicles and railless trolley cars, and to report to a special meeting of the Association. Unfortunately I am not a member of the Association, but I do hope that something tangible will be the outcome of Mr. Fenton's paper, and that we shall not be any longer contented to meet and make our annual grumble.

Mr. W. J. HADFIELD (highways surveyor, Sheffield Corporation): I must apologise for saying anything at this late hour, but I am here in a capacity which not many other people present occupy; I am the highways surveyor for Sheffield, and keep the tramway tracks in repair, and I do so without friction with the tramways department. I think in Sheffield the highways get rather the better of the bargain, not quite so much the best of it as in some Lancashire towns perhaps, because we have rather a different kind of paving. If the Highways Committee had to maintain the whole of the tramways track, it might cost £8,000 a year; on the other hand, if there were no tramways it would save a good deal in the sides of the track, but I should think the present saving to the Highways Committee would not come to more than £2,000 or £3,000.

There is one other point—the position of the Road Board. In some places the Road Board do not seem to have been approached at all, but in Sheffield we have done very well with them, and obtained nearly £30,000 in one form or another. One result is that we have now half a million square yards of tar macadam, and when motor 'buses increase and multiply you will find tar macadam is a very useful form of paving. That is an interesting point to tramway engineers and tramway people generally.

Councillor FENTON (replying on the discussion): I do not think I have very much to reply to, Mr. President. I was hoping to get some very severe criticism this afternoon, and I am afraid I have been rather disappointed. The only critic I have really is our friend Mr. Mozley, who generally criticises most people—(laughter)—and when he asks me the pointed question he has done I may remind him that I think I have said in my paper that I was not giving my own views, but the views which are urged generally, and I will not express any definite opinion about that, except to say that I should be quite satisfied with the present taxation of motor cars with regard to petrol if we could have our share of the money brought into the Road Board exchequer. (Hear, hear.) For instance, in Sheffield we are just having a grant of £17,000 from the Road Board, and no portion of that grant will go on our tramway track. I say no portion; it will be very small indeed, if any at all, but we may take it generally that no tramway authorities have yet received from the Road Board any of the proceeds of the petrol tax for the benefit of the maintenance of tramway tracks. I do think it is not so much a question between the highway and tramway authorities, but an imperial question, and I welcome Mr. England's suggestion that there should be a general revision of tramway legislation, and if possible a consolidating Act which will embody all that is necessary to deal with the subject. It would be for the benefit of every municipality from the tramways side and highways side, and especially from the ratepayers side.

I am very much obliged for the kind reception you have given this paper, and I hope the outcome in due course will be some amendment of the law, setting up a satisfactory position under which tramway authorities—whether municipal or company—shall be placed in the future, so as to give them a fair share of the earnings which ought to be theirs in competition with other concerns. (Applause.)

The PRESIDENT: I know it will be your wish that we should tender to Mr. Fenton our hearty thanks for his very excellent and instructive paper. (Applause.)

The motion was unanimously carried amid applause.

The PRESIDENT: Before this matter is finally disposed of, the Vice-President, who has been giving some consideration to the subject, would like to say a few words.

The VICE-PRESIDENT (Alderman H. Linsley, chairman, Salford Tramways Committee): You will excuse me perhaps if I say a word which deals almost entirely with Mr. Fenton's paper. I have listened with great interest to the paper, and also to Mr. Spencer's opening remarks, and I am in entire sympathy with both of them. But it struck me while listening that we have year after year talked this matter over, and made no practical effort to do anything. We can talk till doomsday, but without an attempt to do something it is of no use talking, and I have drafted a resolution that I thought might be useful in setting the thing going. I am not going to press my resolution, although some resolution I think ought to be pressed this afternoon; I am willing to vote for any other resolution which this gathering may think better. My resolution is:

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"That this meeting is strongly of opinion that the time has arrived when a revision of Section 28 of the Tramways Act, 1870, should be made, as far as it affects tramways undertakings."

Mr England suggested another resolution, and Mr. Spencer I think has another, but I do feel it is a great injustice, which affects the tramways of Lancashire more than in the south, that we should have to maintain the major part of the road when we do not use it. I agree that we should put down a good track, but I think it is the duty of the Highways Committee to maintain it, because as Mr. Fenton said all these grants which have so far come from the petrol tax have not gone towards tramway undertakings, and I think that is not quite fair. I hope something of a practical nature will be done, and that the Executive will follow it up during the next year.

The PRESIDENT: I think it would be opportune to ask the Secretary to read the resolution passed at the Conference in London in June or the beginning of July, which also deals with this subject, so that we may see exactly how it stands.

Councillor J. H. RODGERS (chairman, Newcastle Tramways Committee): Is not this a question which should rather be dealt with at the annual meeting on Friday than in this open conference.

The PRESIDENT: Yes, but I think it is so closely connected with the subject we have been discussing that we should, if possible, focus our opinion a little now.

Councillor RODGERS: We could do that between now and Friday.

The PRESIDENT: If we leave it to nobody it will be nobody's business. It is too wide a subject to discuss generally, but the matter raised now by Alderman Linsley is really a local matter, and we may be told it is a matter for the Tramways Committee and the Highways Committee to deal with. I think it is time we focussed our ideas.

Councillor RODGERS: Alderman Linsley's resolution is not so comprehensive as that.

The PRESIDENT: I take it so.

The HON. SECRETARY (Mr. C. J. Spencer): This was passed on 1st July at an extraordinary meeting of this Association.

"That the Executive Committee of the Municipal Tramways Association is hereby instructed to take such steps as will result in general and more equitable legislation with regard to the whole question of road maintenance, and to act if and when necessary with other associations who may be moving in the same direction."

The PRESIDENT: That resolution empowers us to act with the Tramways and Light Railways Association, who are dealing with the matter. The question is being carefully considered there, and I think it is advisable we should act. Anyway, that special resolution indicates that it was dealt with at our special meeting in July. If there are any other opinions as to the way in which we should deal with it, I should like to hear them.

Mr J. M. MCELROY (general manager, Manchester Corporation Tramways): As one who has taken an active part in the discussion in years gone by, may I say a word? In 1907 the executive committee considered the whole question. The conditions have very largely changed since then, due to the introduction of motor traffic on the roads, but at that time the executive thought—knowing that a very large proportion of the tramway tracks of the country were owned or operated by tramway companies—that if we, the Municipal Tramways Association, took steps to get the revision of this section taken into consideration by Parliament, we should not make very much progress. We knew that in our own towns there would be a split in the camp, part of the Council would be in favour of keeping Section 28, and a part in favour of revising it. We thought the best thing was to do nothing, and we recommended the Council not to do anything just then.

Now there is a very much broader question of road maintenance to be considered as regards all the main roads of the country. I believe before very long the Government will be called upon to form a Royal Commission to consider this question on broad lines. The question of the maintenance of the paving in the tramway tracks is only part of a very much bigger question, and I think the proper course is to let the Executive Council carry out the resolution which was passed unanimously at the June meeting in London. I think that is the best way of dealing with the whole question.

The VICE-PRESIDENT: I think if I delete the words "Section 28," that would embrace the whole Tramways Act.

The PRESIDENT: The resolution passed in July does cover the whole point I think which is troubling us, and that is the question of road maintenance. It refers the matter to the Executive Committee to act with the other Associations as soon as possible. It is already under consideration by the Executive, and has been up on two occasions, and the best thing we can do is to leave it in that way.

The VICE-PRESIDENT: I withdraw my resolution.

The PRESIDENT: Is it agreed that we allow the matter to stand as it is? (Agreed.)

The President read the following telegram received from Vienna:

"Beg to acknowledge kind invitation; send best wishes and sincere greetings for successful Conference.

(Signed) Direktor SPÄNGLER, Vienna Tramways."

The Conference then adjourned until the next day.

## THURSDAY, SEPTEMBER 25.

The Conference resumed its deliberations on Thursday, September 25, at 10-30 a.m., when the President, Mr. A. R. Fearnley, called upon Mr. J. B. Hamilton, who read the following paper:

# URBAN PASSENGER TRANSPORT.

By J. B. HAMILTON

*(General Manager, Leeds Corporation Tramways).*

The question as to which is the best method of conveying passengers in urban districts, having regard to all aspects of the matter, needs no apology for its introduction at a gathering of the Municipal Tramways Association. The present time has been considered by your Executive Council as specially opportune for a discussion of the various methods of transport in populous centres, seeing that the "passing of the tramcar" has been loudly prophesied lately in certain sections of the London Press, and by several more or less irresponsible gentlemen who indulge in bombastic statements which they utterly fail to substantiate in any way.

In the early days of organised street traction, horse-drawn omnibuses were, following sedan chairs, the only possible means of public conveyance. The reduction of traction resistance and the smoother riding which resulted from the introduction of rails in the streets, caused steam and horse-drawn tramways to supersede the horse-drawn omnibus. These forms of traction have again, by the introduction of electricity as the tractive force, been superseded by the modern electric tramcar. The increased passenger capacity of each vehicle, coupled with a much higher effective speed, has enabled a great reduction in fares to be effected. These facts, in conjunction with greater comfort and economy of time, have created a revolution in the habits and possibilities of city life. The purchasing power of a penny has diminished in regard to many commodities, but in regard to tramway transport it will be seen that it has very much increased.

In many provincial cities, and very particularly so in Leeds, previous to the introduction of electric tramway traction, the central and older parts of the city were densely populated. It was necessary for tradesmen, shopkeepers, and others to live in close proximity to the scene of their daily labours, and similarly the working classes were unable to live at any great distance from the various workshops. The provision of a regular form of transit between the centre of the city and the various suburban districts at low fares, at frequent intervals and higher speeds, has completely metamorphosed the distribution of the residential parts of all towns.

It has been found by the writer impracticable to get figures illustrating the alteration in the distribution of the population from many of the towns in the country. It may, however, indicate the position sufficiently to state that in Leeds, in 1912 as compared with 1895, just shortly after the Corporation had taken over the working of the tramways undertaking, the population residing in the two central business wards of the city has decreased in one case by 25 per cent., and in the other by 35 per cent., whilst during the same period increases of from 40 per cent. to 60 per cent. have taken place in districts outside the central zone.

In 1893, by means of horse and steam cars and omnibuses, the number of times the population was carried was 30, whilst the average fare per mile was 1·124d. For the last completed year, 1912-13, the figures are as follow: Number of times population carried during the year, 179; average fare per mile, ·5d. This shows that the travelling habit has developed by nearly 500 per cent. That the services provided by the various tramway undertakers are much appreciated by the travelling public is further evidenced by the growing use of street transport, as each year sees an enormous total of passengers, with a substantial increase over that of the previous year.

All classes of citizens are free to make their homes in whatever district they may choose, knowing they can easily travel between them and the workshops, factories, and business centres; to shop and market at points where large stores and markets are situated, generally in the centres; to attend football matches, places of worship and amusement, and on occasions of holidays to utilise street transport to be conveyed to the outskirts of the city, where they may ramble about and enjoy the beauties of the country.

I think that tramway undertakers throughout the country, whether municipal or company, may claim that by the provision of suitable travelling facilities the great and pressing question of overcrowding and congested areas in unhealthy districts has been made capable of modification, if not of entire solution. This great work has been initiated through the agency of electric traction in the form of tramcars, and its further elucidation will rest with that form of traction or any improvement which science and skill in the future may realise.



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The requirements of the form of traction necessary to meet the conditions which I have outlined must first provide for vehicles capable of dealing with large variations in the number of passengers. These occur on many routes at regular intervals, viz., before 6 a.m., between 8 and 9-30 a.m., between 12 and 2 p.m., and between 5 and 7-30 p.m. On Saturday afternoons the maximum demand practically continues for the remainder of the day from 2 o'clock onwards, rising to the highest peak between 10 and 11 p.m. But during the less busy periods of the day, whilst each car may average 10 to 12 passengers, there are inevitably very considerable irregularities. One car may have practically no passengers, whilst the following one may have from 40 to 50. The size of the vehicles should, therefore, be capable of meeting the public requirements by having a large carrying capacity.

Then there are, in addition to these, emergency requirements for special occasions, such as football matches, public gatherings, attendance at theatres, etc., etc., when a capacity of 60 per vehicle is very essential. Secondly, economy in operation, so as to enable the lowest possible fares to be granted.

The general Parliamentary maximum fare that may be charged is one penny per mile for ordinary passengers, and half that amount as "cheap fares for labouring classes."

Unquestionably a very large proportion of the success which has attended the introduction of electric traction is due to the fact that its economy of operation has enabled the undertakers to reduce fares from time to time, lower and lower, and it is marvellous to note the response in increased travel which each reduction of fare has produced.

In Glasgow, where the writer was a member of the staff at the period when the lines were taken over from the tramways company, the ordinary fare charged by the company was the Parliamentary 1d. per mile. There were practically no overlapping stages, so that for a very short distance in many cases a fare of twopence was charged, and yet the tramways as operated by the company were considered to be a commercial success.

Immediately upon the Corporation commencing operations, they gave halfpenny fares of approximately half a mile in length. From time to time, and within a very short period, the penny fare was increased from one mile up to two miles. The result of all this was that on every occasion when the fares were lowered the total receipts were increased. Under the last fare change which has taken place, viz., the granting of about a mile for a halfpenny instead of half a mile as formerly, the number of passengers within a year has increased nearly 20 per cent., whilst the gross revenue has increased by two per cent., or £20,373.

In Leeds, since 1902, the same phenomena have been noted. Every reduction of fare has produced an increased gross revenue as a result of travelling facilities being more frequently patronised on account of the more attractive fares. In 1902 the number of times the population was carried was 132, in 1912-13, as already stated, it amounted to 179 times.

Mr. J. B. Hamilton.

There must, of course, be an economic limit beyond which the reduction of fares cannot be carried. Whilst wages are increasing, and must continue to do so for some time, in other directions great economies are being carried out. The introduction of steam turbines in large units has lowered the cost of producing energy, as compared with 10 years ago, by practically half. Improvements in section and composition of rails and in the methods of track construction will undoubtedly lessen in the future the item of expense under this head, whilst the developments in other directions may still further increase the economies of operation. I look upon low fares as being essential in fully satisfying and developing the travelling requirements of our great cities and towns.

Thirdly, frequency of service, comfort, and speed of conveyance. The frequency of the service must be arranged according to what experience has shown are the requirements of each route. The best results, however, will be obtained by an over-provision rather than with a narrow margin of seating capacity over the actual number who travel. It is, of course, impossible to co-ordinate the service with the travelling requirements so that at every period of the day the same ratio of passengers and seating capacity should obtain. On every route there are variations from day to day of the period at which the maximum amount of travel occurs which would make that impossible. Again, conditions of weather and many other things vary the travelling requirements from day to day.

The point in the whole matter is that if a vehicle with a capacity of approximately 60 passengers can be provided at the same cost, or less, than a vehicle with a capacity of about 34 passengers, then even at the less busy periods of the day it is very likely to pick up more passengers, and at any rate will carry them, other things being equal, with greater comfort than a smaller vehicle possibly could. The higher the speed at which the conveyance can travel with safety in this hurrying age, the greater is the attraction to the public. Undoubtedly the saving in time—which also means money—on a two mile journey each way per day is of very considerable importance to the travelling public; the difference between six and eight miles per hour on this distance equals 10 minutes.

These are the general requirements which any form of locomotion proposing to serve the needs of the travelling public must, under present conditions, be able to supply. These necessities have undoubtedly been largely met by electric traction. It has created and fostered a demand for travel, which it has also supplied, and any form of traction which proposes to supersede electric tramways in the future must, in my view, meet these needs in a manner superior to tramways.

Several papers have been written during the last year or two, particularly on the subject of "Motor 'Buses *v.* Tramways for Street Transit." Principally, of course, these refer to the position of matters as they exist in the great metropolis of London at the present time. There is no doubt that considerable improvements in lightness and reliability have been embodied in the later forms of petrol omnibus traction as operated in London. In many quarters advocates of the motor 'bus have, without fully considering the matter, enthusiastically hailed this form of traction as the dawn of a new era in street transit, and asserted that tramways are henceforth to be considered as "back numbers."

Lord Montagu, in his evidence before the London Street Traffic Enquiry, was convinced that motor 'buses were so superior in many respects to tramways that he considered there would be no extensions of the latter, and even that their extinction would occur at no very distant date.

Mr. Worby Beaumont, M.I.C.E., who is technical adviser to the Associated London Omnibus Companies, has also recently read a paper entitled, "A Note on Road Passenger Transport in Cities," before the Imperial Motor Transport Conference on July 25, 1913. He considers that, due to the introduction of a "light high-speed internal-combustion motor, the advantage of rails in the streets has almost completely disappeared." "Tramways," he thinks, "continue to be of economic usefulness, more particularly in inter-urban connections, and in special cases where a transport service of some kind is required, but where it is not of sufficient importance to encourage the district authorities to construct well-made highroads." The point in his paper seems to be that a good surface for the roadway is the first and only requirement, and that upon that surface there should be run motor omnibuses. He makes no effort to give any figures to show the cost of making and maintaining the roadways, nor the cost at which the form of traction which he advocates, viz., motor omnibuses, can be run. It seems as if all his arguments were like his roads—to be merely composed of good surface. He is good enough to say that every city has to be individually considered with reference to its public passenger transport, and that circumstances may alter cases. He, however, thinks "that a system which may, if the commercial and general traffic be ignored, be quite suitable for, or even best for, public service passenger transport alone considered, might be so obstructive in its operation as to cause vast losses to the whole community. The system, therefore, which requires the heavy rails and the paraphernalia of a great railway installation in the streets and is of no other use except for the one particular kind of vehicle which is run upon it, has, at the present day, with the recognition of the value of good roads required for the greater part or the whole of the commercial and other vehicles, lost all the original reason for its adoption."

The writer begs the question both in these extracts and throughout the whole of the paper. There is generally no portion of a city's streets which is better paved and maintained than that section which comprises the permanent way of a tramway. Every vehicle using the

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roadway can use that portion of it, and, as the figures in Mr Fenton's paper show, a very large proportion of the commercial and general traffic is carried upon the tramway lines.

To those of us who have had many years' experience of street conditions in various towns in the United Kingdom, it is obvious that relative to its carrying capacity the tramcar is less obstructive to other traffic than any other vehicle running on the streets. For one thing, its position in the street is defined by the rails. Any obstruction which is caused to traffic is caused to it by other vehicles remaining upon the rails, and not by it. It is more sinned against than sinning. Generally speaking, its control is much greater in braking effect than any other vehicle.

Mr. Worby Beaumont's alternative to the tramcar, viz., the motor 'bus, with its strong smells, its tendency to skid, and to the fact that at the rush periods of the day every tramcar as at present would be represented by two motor 'buses, will produce a mental picture to every delegate here of the condition of congestion and confusion which would occur every day in the central thoroughfares of the town they represent.

I have said that the carrying capacity of a motor 'bus is only half that of a tramcar, and that, therefore, for each tramcar there would require to be two motor 'buses; but this is only correct in fine weather. In inclement and rainy weather the effective carrying capacity of the motor 'bus is further reduced by fully one half. Motor 'bus traction, therefore, as compared with the general form of tramcars with covered tops, during stormy weather has only a carrying capacity of one quarter. Surely if there is any obstruction caused by tramcars, the cure proposed—that of substituting four 'buses for one car—is worse than the disease.

Mr. Beaumont rises above all sordid consideration of £ s d., and absolutely disregards the financial side of his recommendations. He does not even casually suggest the financial machinery which would be necessary to produce and maintain at great cost the magnificent roads he requires. He has no observations to make upon the cost of providing motor 'bus transit in substitution for tramway transport. He does suggest that "apart from the cost of its working, the tramcar in Greater London probably costs the community, by obstruction to the free passage of the general traffic and by losses and damage caused by the existence of the rails and the obstructions during repairs, far more than would a rate specially levied to cover interest and redemption of the whole of the capital that now stands as the tramway debt." Having made that statement, which he merely describes as probable, he very wisely does not attempt to proceed to support the bogus contention by a single fact or figure.

A paper entitled "The 'Bus *v.* Tram Controversy and Other Aspects of the London Traffic Problem," by Mr. William Yorath Lewis, A.M.I.M.E., etc., was read before the Society of Engineers on the 3rd February last. Mr. Lewis, whose paper is very cleverly written, makes a very fair comparison of the position of matters as between tramways and motor 'buses in London. He thinks "Londoners would do well to insist upon greater attention and less biassed consideration being given to the traffic problem, since it is unquestionably a matter of vital interest to both the classes and the masses. Cheap and effective rapid transit is the lifeblood of trade and the raw material of industry. It is the key of prosperity, the breath of modern life."

In these epigrammatic phrases the writer has crystallised the present day and future necessity for suitable urban transport. He further protests against the articles in the newspapers on motor 'buses *v.* tramcars, which he says have been "more in the nature of an attack upon the trams than a fair debate. In fact it has clearly been an organised attempt of motor enthusiasts and 'bus interests through various organisations, backed up by their friends in the trade Press and in political quarters, to protect the 'bus monopoly in the central area and to increase the robbery from the tramway undertaking of traffic which the latter has legitimately developed in the suburbs." To this end untrue and ridiculous statements have been made in many of the papers.

I had the pleasure of reading and hearing a paper given at the Congress of the Tramways and Light Railways Association by Mr. Pott, the chief engineer of the Metropolitan Electric Tramways, entitled, "The Respective Values of Tramways, Motor 'Buses, and Railless Traction as a Means of Transport."

A careful perusal of this paper in my view accords to the motor 'bus a position to which it is not justified on financial results. It is true that a comparison of working costs as between tramways and motor 'buses is shown. If Mr. Pott had the table for motor 'buses to prepare now, I am quite sure he would make one important alteration, viz., in the cost of petrol, which is given as ·7d. per 'bus-mile, with petrol tax at ·3d. The very great increase in the cost of petrol since the date of reading the paper would at least double these figures. The working costs also make no provision for depreciation in either of the forms of traction. Mr. Pott has also unfortunately ignored the lessened earning capacity on account of the size of the motor 'bus and the fact that it is not covered in on the top.

Full and reliable statistics are published annually by all the municipal tramways undertakings, and as a result of the standardisation of accounts, the inception of which was due to this Association, in most details the figures are directly comparable and provide data which is beyond question or cavil. To enable a comparison of the results of operation of their tramway undertakings by municipalities to be made upon a broad basis, I have taken every town—except London, where the form and cost of construction and other conditions are quite exceptional—which contains a population of over 150,000. These are scattered over all parts of the United Kingdom.

The object has been to ascertain:

First, the average annual earnings per car running daily in the towns quoted.

Secondly, the average cost, per mile and per car, of running those cars—this cost to include operating expenses, and interest and sinking fund required by Parliament. I have excluded all optional sums such as additional depreciation or renewals which may have been set aside according to the views of the various municipalities. In the case of motor 'buses the same procedure has been adopted.

Thirdly (*a*) I have estimated the annual value per car of the sums which the various tramway undertakings pay for maintenance of paving and sub-structure under Section 28 of the Tramways Act of 1870, and which, although unaffected by the operation of cars, goes to the relief of the department charged with the general maintenance of highways, and

(*b*) The amounts paid in rates upon lines only.

In the case of motor 'buses I have estimated the receipts (based on the earning capacity), the expenses of running, the cost of wear and tear of roads, in respect of which no contribution is made at the present time, and also the amount which would be paid to the Inland Revenue as a result of the use of petrol.

These various details are set out in Forms A, B, C, and D, and supplemented by explanatory notes on Schedules 1, 2, and 3.

Dealing with these points seriatim, I find there are 27 towns (Schedule No. 1) with a population of over 150,000, and that as a result of tramway operations in these towns there is an aggregate annual revenue of £6,769,705, that the average number of cars in daily use on the various undertakings on the basis of a 14 to 16 hour day is 3,996, whilst the total number of cars in stock is 5,687.

Dividing the total revenue by the number of running cars, I find that the average annual revenue per car is £1,694 (see Form A).

The total expenses, which include working expenses, interest, and sinking fund, income tax, rental of lines, less credits for bank interests, etc., amount to £5,607,732.

The total mileage run amounts to 146,810,902, which gives an average cost per mile for expenses of 9·167d.

Again, dividing the total mileage by the number of cars in daily use, an average annual mileage per car of 36,740 is obtained.

Multiplying this number of miles by the expenses per car-mile gives an average cost per car per annum of £1,403, which deducted from the earnings leaves a surplus of £291 (Form A).

The amounts shown in the published accounts for rates do not separate the amounts paid for buildings and for lines. It seems to the writer that the amount of rates for tramways should, for the purpose of comparison with motor 'buses, be confined to lines only. It is obvious that in the case of motor 'buses they will require to pay rates upon depots in the same way as tramways. They will not, of course, pay rates upon any power-station, but for the purposes of this paper this advantage to motor 'bus costs has not been taken into account.

As the basis of allocation of the rates to be made as between lines and buildings, I have taken the Leeds accounts as an illustration (Schedule 2). From these I find that about 75 per cent. of the total rates is for lines and 25 per cent. for buildings. In Leeds the tramways undertaking owns the power-station, which in this case, therefore, is a portion of the 25 per cent.

The total annual charge for rates on lines and buildings for the 27 tramway undertakings amounts to £315,239. Allocating this as between lines and buildings on the Leeds basis, viz., 75 per cent. of the amount for lines, gives £236,429 (Schedule 2). Dividing this again by the number of cars, the annual amount paid per vehicle is found to be £59 (Form A).

The excellent paper which was read before the Association yesterday by Mr. Fenton, will have proved to members conclusively that the conditions which guided Parliament in placing the maintenance of the surface of the highways between tracks, and for 18 in. beyond it, upon tramway undertakers, have entirely changed with the advent of mechanical traction. No wear can be caused to the paved surface of the streets by the passing of vehicles which are confined to rails, and the continuance of this obligation upon tramway undertakings has had a most repressive effect upon the development of rail transit.

As between different departments of a Corporation, it is relatively merely a matter of accountancy, because to the ordinary ratepayer it is immaterial whether the fare which is charged for a tramway journey provides, in addition to the direct costs of the construction and working of the tramways, an additional sum which pays for other public services, such as maintenance of portions of the highway entirely unaffected by tramways, and towards rates, the advantages of many of which can only affect tramways in a minor degree.

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I believe, however, that indirect taxation of this kind is inequitable and unjust, and at the present time, when the character of street traffic, owing to the introduction of petrol and steam-propelled vehicles, is undergoing such a change which must force upon Parliament some altered conditions of taxation for the increased road maintenance, I would urge most strongly that the question of this most unfair charge upon tramways should come under revision.

It is impossible from the accounts of the various tramway undertakings to get an accurate statement of the amount which Clause 28 of the Tramways Act imposes upon tramway undertakers as apart from costs incidental to the construction, maintenance, and renewal of the rails. There is no doubt that the presence of the rails does cause a certain amount of extra wear upon the setts which are placed alongside of it, whilst rail movement, which from time to time must occur on all routes, also increases the cost of maintenance of the paved surface.

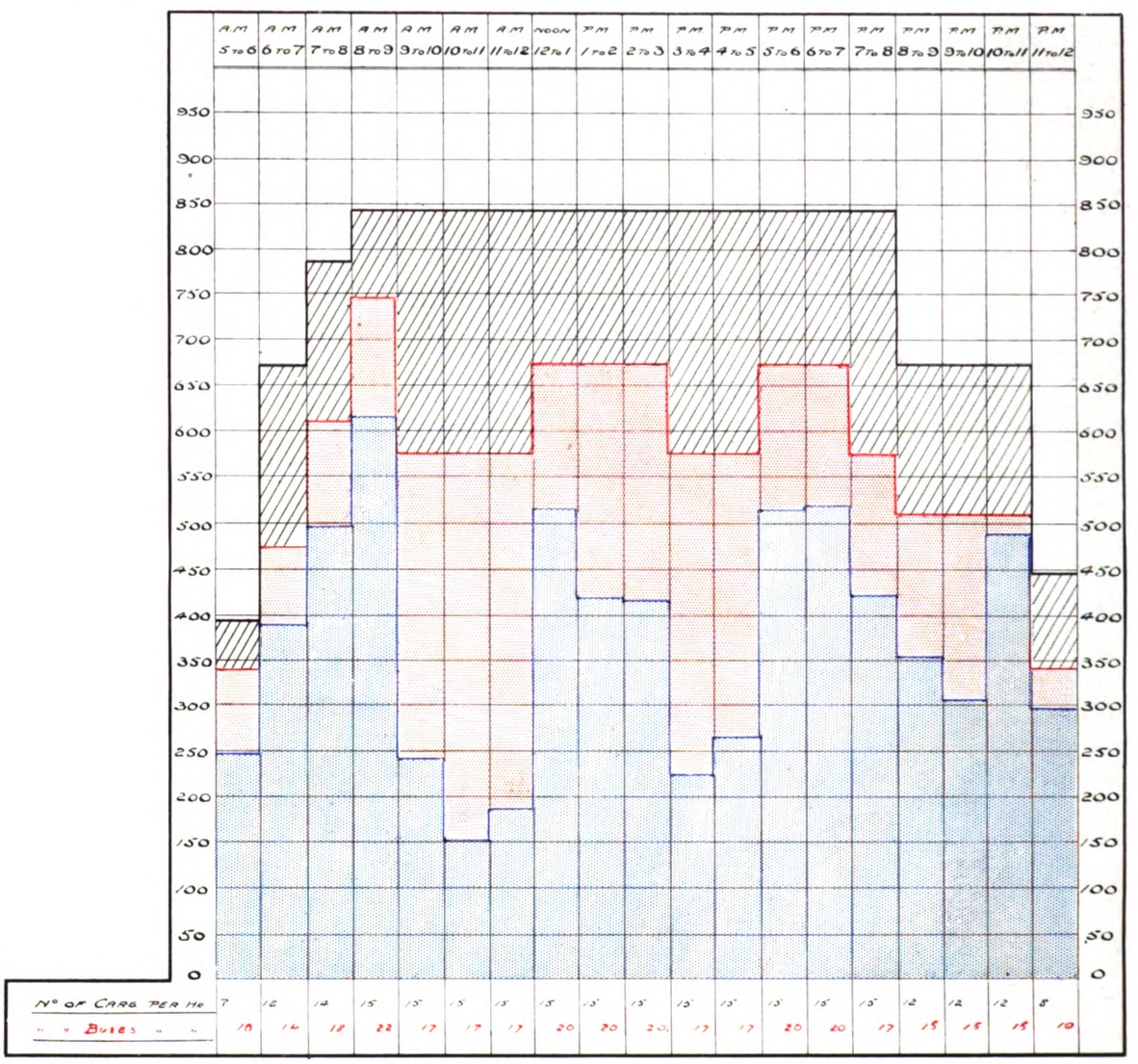
£3,040 would be required. This figure represents the replacement cost of the concrete bed and paving setts, etc., less the residual values.

These figures applied to the number of cars give an average charge per vehicle per annum of £61. (Form A.)

In considering the costs of energy it may be a matter of opinion, but in my view the extraordinary development in turbines has cheapened the cost of current to such an extent that it is easily possible to estimate that in the prices paid by the various undertakings which purchase current, there is a considerable profit per unit to the producing department.

I have not, however, added any figures as being a portion of the other general advantages in lowered costs, etc., which the supply of electricity to a tramways undertaking gives to the city user generally, or as a profit in relief of rates.

By adding together the items dealt with, a total is arrived at of £411




Blue.—Total Number of Passengers each hour. | Black.—Seating Capacity of Cars (56) each hour.
Red.—Seating Capacity of 'Buses (34) ,, ,, | Margin of Vacant Seats for Intermittent Loading—'Buses 54%, Tramcars 103%.

**Leeds City Tramways.—Diagrammatic Chart showing actual operating conditions of Tramway Service and estimate of Motor Omnibus Service on supposition that the latter has an earning capacity of 80% of a Tramcar.**

To form a reasonable estimate, I have assumed that the cost of the maintenance of the concrete, the paving bed and setts at the periods when the rail requires to be taken up should be taken to be work performed not for the tramways undertaking, but for the advantage of the highways rate.

For that assumption I have estimated the average life of the rail at 15 years. The whole of the maintenance of the setts during the 15 years of the life of the rail—and this is a considerable item—I have charged as being directly caused by the presence of the rails. On this basis I find that at the end of 15 years a sum of £1,331 per mile of single track would be the cost of taking up, re-dressing, and re-laying the setts, repair of any concrete required, and provision of floating, paving bed, etc. (Schedule 3.)

At the end of 30 years from the laying of the track a cost per mile of

per tramway vehicle per annum. (Form A.) In other words, an average surplus of £291 (Form A) per car accrues from the operation of tramways in the towns referred to, and owing to the presence and operation of the tramways an addition to that amount of £120 (Form A) in rates paid, and in maintenance of roads, goes to the general benefit of the town, and in none of these respects would the operation of petrol omnibuses furnish any return to the city.

Turning to the financial consideration of motor omnibuses (Form B), it must be obvious to everyone who considers it that the carrying capacity of a passenger vehicle is an important factor in determining its earning power. In all the cities and towns referred to, the provision of travelling facilities is varied at different hours of the day on the different routes according as experience has shown the travelling requirements ebb and flow.

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To provide sufficient accommodation for the busy periods, and whilst considering full employment for the crews to be able to withdraw sufficient vehicles so as to be running as little as possible unnecessary mileage at slack times, is the continuously strenuous effort of the traffic staff.

The size of the modern tramcar, which may be taken as having a seating capacity of say 56 passengers, with in many cases the addition of eight standing, is the outcome of applied experience under varying conditions of traffic and graded fares as being the size of vehicle upon which, when fully loaded with passengers, the collector can be expected to deal satisfactorily with the fares, etc. If some simpler form of fare collection or incidence of fare charges, such as 1d. any distance, and so on, is operated, then there is no reason why all cars, as they already are in some instances, should not have a carrying capacity of 70 to 80 passengers. In that case the cost per seat supplied would be proportionately lowered.

In carrying capacity it is clear that the motor 'bus, even of the most up-to-date type, cannot hope to compete. On paved streets and on gradients such as exist in nearly every provincial town, a vehicle for passenger traffic which has a capacity of over 34 passengers is not a practicable proposition. It is, of course, quite easy to increase the engine and size of the vehicle, and relatively of its load, but it is not possible to do so and maintain the effective rate of speed at which tramcars are operated. The question of brake control, skidding, and road wear, becomes a most serious consideration, and indeed a prohibitory condition, if the size and consequently the weight of the motor 'bus is increased much beyond the London type, which seats 34.

If the seating capacity of a tramcar at 56 is compared with a motor 'bus of 34, then the latter has only 60 per cent. of the capacity of a tramcar.

It may be urged that at the periods of the day when the minimum amount of travel occurs, a vehicle with a capacity of 34 can earn as much per mile run as a vehicle with a capacity of 56. To provide a comparison, I have caused very careful examination to be made into the actual results obtained from tramway operation on a representative route. I append to this paper (p. 332) a diagrammatic chart showing the actual number of passengers carried hourly at the various hours of the day, and also the actual number of seats provided on the tramcars.

Notwithstanding that the capacity of a motor 'bus is only about 60 per cent. of that of a tramcar, I have estimated that the earning capacity of a motor 'bus may be taken over the whole day as being equal to 80 per cent. of that of a tramcar.

On the diagram referred to, I have shown the actual carrying capacity which motor 'buses would provide if the number of motor 'buses were increased on the assumption that the capacity of a 'bus equals 80 per cent. of that of a tramcar. In this connection it will be noted that the view that a motor 'bus can earn 80 per cent. of a tramcar's receipts in actual practice is a liberal one, and whilst it makes provision for the average hours, there is a much smaller margin of surplus seats to provide for intermittent loading than in the case of tramways.

On the assumption, therefore, for the purposes of this paper that each 'bus will earn 80 per cent. of each tramcar's receipts, then, as the latter as shown earns £1,694, each motor 'bus would earn £1,355 (Form B), running the same number of miles per annum, viz., 36,740.

With regard to the cost of running motor 'buses per mile, it must be agreed that considerable improvements, which reflect themselves in lessened costs of repairs and maintenance, have been applied to motor 'buses during recent years.

The principal users of motor 'buses have, of course, been the large London companies.

The whole of the conditions there are unique; the growth of the business portion of the metropolis preceded the development of almost any form of street transit. The density of the traffic even in the days of the horse drawn 'bus and cab, was without parallel in any city in the world.

Electric-conduit traction which followed horse-drawn tramways, with its increased speeds and greater attractions for the travelling public, could only be applied in wider or less densely thronged streets than those in the centre of the city through which all the traffic passes. It has, therefore, been impossible, owing to the width of the highways and the amount of traffic, to apply rail transit in the main highways of the City, and it has had to be confined to the approaches to the City.

In this respect it is entirely different from practically every other great city or town in the country where the ramifications of the tramways are carried right through the busiest central parts, from east to west, and from north to south.

The physical barrier to the extension of the tramways through the centre of London gave for many years a protective area to the horse-drawn omnibus which, due to the limitations of this form of traction, was only able to extend its services beyond the centre for a very short distance to the areas outside.

The advent of the motor 'bus which has superseded horse traction, coupled with the improvements in weight and reliability of the last few years, has enabled the motor 'bus, subsidised by its protected area and freed from the onerous charges imposed upon tramways in the form of rates, road maintenance, etc., to adopt an aggressive competition with the electric lines operated by the London County Council and the various municipalities and private companies surrounding the central area.

This enormous volume of street traffic has imposed upon the road authorities in the centre of London and the borough councils around it, the necessity of maintaining a very high standard of road surface. The expression "as smooth as a billiard table" has frequently been truthfully applied to the main thoroughfares of Greater London. The absence of gradients has also been a very great factor in producing the financial success which the motor 'buses have achieved.

Looking to all these conditions which only exist in London and in no other part of the country, it is obvious that an impartial consideration of urban passenger transport to be operated in all the great centres of population in Britain cannot accept the revenues or operating costs of motor 'buses in London as providing a fair estimate of what might occur from installing the same form of transport in the provinces.

Consideration of the comparative merits of the two forms of traction must presume that it is possible to have either in operation. In London, for the present time at least, it would be impossible to institute rail transit along the main highways of the City.

Any figures, therefore, which it would be possible to obtain as to the cost of operating motor 'buses or the receipts obtained by the London companies, must be considered as quite exceptional. No authoritative figures, however, have been issued. In the accounts of the London General for 1912, a figure of 9·76d per mile has been given. It is probable, however, that as the company very naturally do not desire to inform the public of the exact costs of their operation, this figure cannot be taken as being a correct one. It has been impossible to get reliable figures of the cost of operation from companies operating motor 'buses in other parts of the country. There are, of course, very few companies on any large scale which do so.

Mr. Pott, who carefully prepared a paper last year, gave some figures for the cost per 'bus-mile of omnibuses. These figures, he stated, were averages of the actual working costs of several large undertakings. As Mr. Pott's figures were evidently prepared before the very large increase in the cost of petrol during the early part of the present year, I estimate an increase of one penny per mile for petrol.

Further, the figures do not include any sum for depreciation. On the basis of the time allowed by Parliament for sinking fund, viz., five years, this amounts on a mileage of about 25,000 to 1·54d. per mile, making the total cost 10d. per mile.

| | d. |
|---|---|
| Petrol | ·7 |
| Repairs of cars – | |
| Electrical equipment or engines | ·25 |
| Truck or chassis repairs | ·5 |
| Rubber tyres | 1·0 |
| Bodies and paint | ·298 |
| Petrol tax | ·3 |
| Buildings, repairs, and maintenance | ·01 |
| Running | 2·617 |
| Administration | ·75 |
| Insurance | ·1 |
| Rates and taxes | ·12 |
| Licences | ·075 |
| Accidents | ·4 |
| Interest on capital | ·4 |
| | 7·52 |
| Increased cost of petrol | 1·0 |
| Depreciation | 1·54 |
| | 10·06 |

In the case of municipalities whose figures are usually available, the Corporations of Keighley and Eastbourne have been working fleets of motor 'buses for a number of years.

The costs of operation are as follow:

Keighley, 16d.; Halifax, 12·7d.; Eastbourne, 14·30d. per mile.

Any conclusions, however, drawn from the figures appertaining to Keighley or Eastbourne would be unfair to the motor 'bus, inasmuch as these are mainly vehicles which are not of the most modern type.

Again, the most modern type having been in operation for so short a time, results of a nature which would average over the whole life of a 'bus have not yet been obtained.

I may, however, refer to the case of Halifax, who have quite fairly given their figures in their annual accounts lately issued. These, of course, only apply to comparatively few months of a period of the life of a 'bus when the costs of maintenance and repairs should be at the minimum. On the other hand, the routes upon which the vehicles are operated have at some points a very rough surface, and no doubt this to some extent has adversely affected the costs.

After a very great deal of consideration and examination of private figures, I have come to the conclusion that 10d. per mile, to include all costs of operation, interest upon the outlay, and sinking fund as applied by Parliament in a like manner as with tramways, is a fair and

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reasonable figure. In this respect I understand from a communication that I am in agreement with our esteemed President, who has during the last few months been operating some modern motor 'buses.

In applying the figure of 10d., I should like it to be clearly understood that I think this a very reasonable figure, looking to the cost of petrol at the present time, and that in the capital account no notice has been taken of the fact that for the purpose of working city services of the magnitude under review in this paper, a large margin of spare 'buses would be required as against tramcars. This would undoubtedly considerably increase the cost per mile for interest and sinking fund. On the basis of 10d. per mile, I find that the total expenses per vehicle would be £1,531 (Form B). This amount is greater than the earnings, and therefore leaves a deficit of £176 per vehicle per annum.

I presume it will be at once said: "There is no person who will run motor 'buses in the 27 towns referred to at a loss." My answer is to ask how that profit would be made unless the fares were increased or the frequency of service reduced. If the present low fares, which in most cases approximate to two miles for 1d., were continued together with the present services, which are such an important factor in saving time and increasing the convenience of the travelling public, then the results must inevitably be as I have put them.

As I have already pointed out, tramways, in addition to providing a profit per vehicle per annum, also contribute to the rates on lines and in general road maintenance. To none of these, under the present condition of the law, would motor 'buses contribute, but on the contrary would cause wear and tear upon the streets.

Much discussion has taken place during the last year or two on the question of road maintenance by vehicles, and in a previous part of the paper the writer has stated that in his view the time is now urgent when amendments to the existing law as to the method of taxation for road purposes should be carried out. In practically every case during the last session of Parliament in which powers have been sought for railless cars and motor 'buses, the decisions were that they shall directly contribute to the repair of the wear and tear and what was termed damage to the highways in varying degrees. The amount generally imposed has been ⅜d. per mile. I express no opinion here as to whether this is or is not a sufficient sum, or as to whether or not in the absence of charges being made general upon all road users, this obligation should be placed upon promoters of motor 'bus traction. I compare the ⅜d. per car-mile which has been imposed for running usually on macadamised roads, with the amount of wear which might occur upon streets which are paved and partly macadamised, and as a result I debit the operation of motor 'buses in urban districts with ¼d. per mile as an estimate of the cost of repairing in consequence of their running. This amounts on the mileage to £38 per vehicle per annum, and increases the deficit from £176 to £214 (Form B). As a deduction, however, from this, credit must be given to motor 'bus operation for the amount at which the petrol they use is taxed by the Government and earmarked for road purposes. This equals 1½d. per gallon, and I estimate that on the basis of 7½ miles per gallon this amounts to a total of approximately £31 per annum. This amount deducted leaves a net deficit per motor 'bus of £183 (Form B).

This for the whole of the 27 undertakings is an annual loss of £914,085 (Form C).

Summarising the position, it means that instead of the various towns getting, as at present, a profit in receipts and other services to the towns of £1,642,356, there would be a loss of £2,556,441, due to the assumed substitution of motor 'buses for the existing tramways (Form C).

Applying these figures to Leeds, it would make an adverse difference to the city of £137,600 per annum. Instead of an annual benefit to the rates—including net surplus to relief of rates, renewals of paving, and local rates payable—of £88,371, there would be a loss on motor 'bus operation of £49,229, or a total loss of £137,600 as before mentioned.

On Form D the whole financial consideration as between the two forms of passenger transport is focussed to a point. The annual cost per seat provided in the case of tramways is under £23, whilst for motor 'buses it is over £45, or practically double that of tramways.

Summarising the position as between tramways and 'buses, it does not seem to the writer that even if tramways were not already installed and the expenditure made, there could be the slightest hesitation from any point of view in the selection of tramways for urban passenger transport as against motor 'buses. The fact of its larger carrying capacity, the economy, safety, and speed of its operation are overwhelmingly in favour of the tramcar as against the inevitably smaller motor 'bus with its greater unreliability in operation, its higher cost of working, and tremendously increased danger of operation to pedestrians and other road users.

In the latter respect the facts given in the report of the Select Committee on Motor Traffic show that motor 'buses have seven times the number of fatal accidents, and twice as many injuries per million passengers, as compared with tramways. "This lessening of the margin of safety applies not only to the motor 'bus, but also to other mechanically-driven vehicles." The observations of the Committee in this respect are "that accidents and fatalities with tramcars which are more in number have not increased, but there is still room for improvement, whilst petrol-driven vehicles have increased greatly in number and the total number of accidents and fatalities having increased in greater proportion than the total number of vehicles, it is to this class of traffic that the growing danger is due."

On the question of safety, it is stated in the report of the Advisory Engineers of the Royal Commission with regard to motor 'buses that "their very elasticity which permits them to turn out from their stopping- places out of their proper order and to meander and move sideways on the road and to be driven two and more abreast is in many cases a material element to road congestion. Flexibility implies taking advantage of chances of passing other vehicles, and although it may be an advantage in speed as against other *competitors*, it is not without its special element of danger."

### RAILLESS TRACTION.

At such length has the main question of Tramways *v.* Motor 'Buses been discussed, that but little space can be devoted to this or other forms of traction. As a means of transport for urban traffic, it suffers from the same limitation in size which applies to the motor 'bus and all other vehicles which run upon the road surface at a sufficiently high speed to meet the customary requirements of passengers. Unlike the motor 'bus, however, it is entirely free from smell, and it may also be claimed for it that it is almost entirely free from the tendency to skid. The latter is due no doubt in a large degree to the fact that the motors and weight are not placed upon one end of the chassis, but are slung below the level of the chassis and near its centre.

In total costs of operation under ordinary conditions, it is at least from 20 per cent. to 25 per cent. less per car-mile than motor 'buses. It is equal in flexibility, in an ordinary width of roadway, viz., 30 ft. to 35 ft., to a motor 'bus.

After being in use for a good number of years on the Continent, it has now been brought into operation in eight different districts in England, and several undertakings are now in course of construction.

It has never been claimed for it that, except under special conditions, it should be substituted for tramways in cases where very large volumes of traffic are required to be dealt with, nor where a very close and frequent service is necessary. In streets or highways which are too narrow to permit of the passing of vehicles confined to rail traction in conjunction with other vehicular traffic, for districts where the traffic is too infrequent to justify the higher capital outlay necessitated by tramway construction, and generally as an auxiliary to and as feeder for tramways, this form of traction has a very great future.

Its lessened costs as compared with that of motor 'buses, and its greater reliability in operation, make it preferable, as a feeder to an electrically-operated undertaking, to that form of traction. Each case must be judged on the local conditions, and in relation to the cost of installation and operation. Routes can certainly be more readily dropped and new ones opened with the migratory motor 'bus.

Other forms of supplying urban transport, such as petrol-electric motor 'buses, storage battery, steam, etc., vehicles, I do not think it necessary to enlarge upon. In every case the remarks as to higher costs of operation and general disadvantages, as referred to in connection with petrol motor 'buses, apply equally to them.

In London the example of conduit tramways is in full operation. Whilst this avoids the erection of poles and trolley wires, it has the very serious and in most cases insuperable objection of the cost of construction. It is only a city such as London that would be justified in facing this greatly increased cost. Apart from its higher cost of construction and operation, it claims the same advantages over motor, etc., 'buses, as overhead electric tramways.

Other forms of rail traction, such as surface-contact, have been in in operation in different parts of the country, with more or less satisfaction, for a number of years, and some self-contained forms of traction are being tested at the present time by means of petrol-driven tramcars. The latter, though still immature, may be found most useful where it is undesirable to erect overhead wires, but the costs of operation, which must be higher than where electricity is the tractive force, are not yet established.

There are, no doubt, many aspects of the great question of passenger transport upon our city streets which within the limits of a paper of this kind I have not touched upon, or done so in a very brief way. In the discussion which I trust will follow, other phases of the matter will, I hope, be fully dealt with.

One conviction stands out clear and distinct in my mind, and that is that the era of rail transit for the above purposes shows not the slightest sign of being superseded by any other form. The petrol combustion engine has done many wonderful things in increasing the possibilities of speed of motor cars and boats, and in assisting in the conquest of the air, and naturally those who are identified with it consider there are no bounds to its possibilities in any direction.

The report of the Select Committee on Motor Traffic makes it abundantly evident that motor 'buses are infinitely more dangerous from their very mobility than the rail-confined tramcar with its defined position in the street. As *Punch* has illustrated it, the tramcar can only go where the rails permit, whilst the motor 'bus can go where it

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likes, and very frequently it unfortunately seems to go where it causes injury and damage.

To epitomise briefly the position, the motor 'bus has seven times the number of fatal accidents per vehicle per annum and twice as many injuries per million passengers as compared with tramways. Its obstructive street condition in fine weather is as two 'buses are to one tramcar, and in inclement weather as four 'buses to one tramcar, whilst the cost to a municipality of providing transit by motor 'buses is double the amount per seat provided by electric tramways.

## FORM A.

### COMPARATIVE STATEMENT

showing actual result of tramway operation in 27 towns of over 150,000 in population, as compared with result, assuming transport was effected by means of motor 'buses.

RESULT OF TRAMWAY OPERATION.

| | £ |
|---|---|
| Aggregate annual receipts on 27 tramway undertakings each serving over 150,000 population. (See Schedule No. 1) | 6,769,705 |
| Average number of cars in use daily on these undertakings = 3,996. | |

TRAMWAY RECEIPTS.

| | |
|---|---|
| Average annual amount earned per car £6,769,705 ÷ 3,996 = | 1,694 |

TRAMWAY EXPENSES.

| | |
|---|---|
| Miles run to earn above annual receipts: | |
| Aggregate miles = 146,810,902. | |
| Do. cars in daily use, 3,996. | |
| 146,810,902 ÷ 3,996 = average miles per car = 36,740. | |
| Total expenses at 9·167d. per car-mile = 36,740 × 9·167d... | 1,403 |
| Surplus .. .. .. .. | 291 |
| Add back, average annual rates paid on lines only of 27 tramway undertakings. (See schedule No. 2) = per car | 59 |
| Add back, average annual charge in respect of renewals of paving of tracks and margins. (See Schedule No 3) = per car .. .. .. .. .. .. .. | 61 |
| Total surplus per car .. .. | £411 |

## FORM B.

### COMPARATIVE STATEMENT

showing actual result of tramway operation in 27 towns of over 150,000 in population, as compared with result, assuming transport was effected by means of motor 'buses.

| | £ |
|---|---|
| Average amount earned per tramcar per annum in 27 towns of over 150,000 population. (Form A) .. .. .. | 1,694 |

MOTOR 'BUS RECEIPTS.

| | £ |
|---|---|
| Comparative earning capacity of motor 'bus as against tramcar = 80 per cent. 80 per cent. of £1,694 = .. .. | 1,355 |
| Miles to be run in order to earn above receipts (Form A) 36,740 miles. | |

MOTOR 'BUS EXPENSES.

| | |
|---|---|
| Total expenses—10d. per mile—36,740 miles = .. .. | 1,531 |
| Deficit .. .. .. .. .. | 176 |
| *Add to Deficit.*—Wear and tear of road at ·25d. per mile. Expenses per 'bus per annum (36,740 × ·25d.) = .. | 38 |
| | 214 |
| *Deduct from Deficit.*—Amount payable to Inland Revenue on account of petrol tax of 1½d. per gallon. Estimated consumption 7½ miles to gallon (36,740 miles ÷ 7½ × 1½d. = £31) .. .. .. .. .. .. .. | 31 |
| Total deficit per 'bus .. .. | £183 |

## FORM C.

### COMPARATIVE STATEMENT

showing actual result of tramway operation in 27 towns of over 150,000 in population, as compared with result, assuming transport was effected by means of motor 'buses.

Estimated amount of loss involved by substitution of motor 'buses for tramways under present conditions.

| | |
|---|---|
| Annual deficit estimated to result from operation of motor 'buses. (Form B.) Per 'bus .. .. .. | £183 |
| Number of 'buses required daily on 27 undertakings in place of present number of cars in operation: | |
| Cars in operation (Form A) .. .. .. | 3,996 |
| Add further number of 'buses required daily on 27 undertakings due to smaller capacity of 'bus = 25 per cent. of 3,996 .. .. .. | 999 |
| 'Buses .. .. .. .. | 4,995 |
| Annual deficit on operation of 'buses—4,995 'buses at £183 = .. .. .. .. .. .. .. | £ 914,085 |
| Loss of profits accruing annually from operation of tramways. 3,996 cars at £411 per car (Form A) | 1,642,356 |
| Total annual loss involved .. .. | £2,566,441 |

## FORM D.

### COMPARATIVE STATEMENT

showing actual result of tramway operation in 27 towns of over 150,000 in population, as compared with result, assuming transport was effected by means of motor 'buses.

Comparison between cost of operation of tramcars and motor 'buses per seat provided per annum.

COST OF OPERATION OF TRAMCARS.

| | £ | £ |
|---|---|---|
| Per car per annum. (See Form A) .. .. .. .. | | 1,403 |
| *Less* rates on paving of track (included in above): | | |
| Rates .. .. .. .. .. .. | £59 | |
| Paving .. .. .. .. .. .. | £61 | |
| | | 120 |
| Net cost per tramcar per annum .. | | £1,283 |
| Number of seats provided per tramcar = .. .. | 56 | |
| Cars—Net cost per seat provided per annum .. .. | | £23 |

COST OF OPERATION OF MOTOR 'BUSES.

| | £ |
|---|---|
| Per 'bus per annum (see Form B) .. .. .. .. | 1,531 |
| *Add* road maintenance (see Form B) .. .. .. | 38 |
| | 1,569 |
| *Deduct* petrol tax (see Form B) .. .. .. .. | 31 |
| Net cost per 'bus per annum .. | £1,538 |
| Number of seats provided per motor 'bus = .. | 34 |
| 'Buses—Net cost per seat provided per annum = .. | £45 |

## SCHEDULE No. 1.

Aggregate receipts and expenses, passengers carried, and car-miles run per annum in connection with 27 municipal tramway undertakings each serving a population of over 150,000, together with other statistics referred to in Form A.

| Name of Town. | Per Annum. | |
|---|---|---|
| Aberdeen .. | Total receipts .. .. .. | £6,769,705 |
| Birmingham .. | ,, expenses .. .. .. | £5,607,732 |
| Belfast .. .. .. | ,, car-miles run .. .. | 146,810,902 |
| Blackburn .. .. | ,, passengers carried .. | 1,580,514,058 |
| Bolton .. .. .. | Average number of cars in use | 3,996 |
| Bradford .. .. | Total length of track operated (reduced to single) .. | 1,671 miles |
| Burnley .. .. | | |
| Croydon .. .. | | |
| Cardiff .. .. .. | | |
| Dundee .. .. | | |
| Glasgow .. .. | | |
| Halifax .. .. | | |
| Hull .. .. .. | | |
| Huddersfield .. | | |
| Leeds .. .. .. | | |
| Leicester .. .. | | |
| Liverpool .. .. | | |
| Manchester .. .. | | |
| Newcastle-on-Tyne | | |
| Nottingham .. .. | | |
| Oldham .. .. | | |
| Portsmouth .. .. | | |
| Salford .. .. | | |
| Sheffield .. .. | | |
| Sunderland .. | | |
| West Ham .. .. | | |
| Wigan .. .. .. | | |

## SCHEDULE No. 2.

### RATES ON TRAMWAY TRACKS.

Expenditure devolving upon tramway undertakings in respect of assessment for local rating purposes of lines only. (Referred to in Form A.)

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LEEDS CITY TRAMWAYS.

Division of total rates payable between lines and buildings.

Assessment of hereditament:

| | | | |
|---|---|---|---|
| Lines .. .. | £33,207 | = | 75·5 per cent. |
| Buildings .. | £10,815 | = | 24·5 per cent. |
| Total .. | £44,102 | = | 100 per cent. |

Total annual charge for rates on lines and buildings for 27 tramway undertakings each serving populations of over 150,000 .. .. .. .. .. .. .. .. £315,239

Allocation of above annual charge based on Leeds proportion.

Lines only—75 per cent. of £315,239 = Rates payable annually on lines only .. .. £236,429

AVERAGE NUMBER OF CARS IN USE, 3,996.

Average annual rates payable per car .. .. .. £59
(£236,429 ÷ 3,996 = £59).

SCHEDULE No. 3

PAVING OF TRAMWAY TRACKS.

Expenditure devolving upon tramway undertakings in respect of partial renewals and complete renewals of paving of tram tracks and margins. (Referred to in Form A.)

RECONSTRUCTION AND PARTIAL RENEWAL OF PAVING, ETC., OCCURRING AT END OF 15 YEARS DATING FROM CONSTRUCTION OF TRAMWAY.

Estimated cost per mile of single track .. .. .. £1,331

Aggregate length of tramway tracks operated by 27 authorities each serving populations of over 150,000. Miles of single track 1,671.

Cost per mile £1,331 × 1,671 miles total cost of partial renewals .. .. .. .. .. .. £2,224,101

COMPLETE RENEWAL OF PAVING AND FOUNDATIONS OCCURRING AT END OF 30 YEARS DATING FROM CONSTRUCTION OF TRAMWAY.

Estimated cost per mile of single track .. .. .. £3,040

Aggregate length of tramway tracks operated by 27 authorities. Miles of single track = 1,671.

Cost per mile £3,040 × 1,671 = total cost of complete renewals £5,079,840

Total cost of partial and complete renewals of paving and foundations to be spread over a period of 30 years (£2,224,101 + £5,079,840 =) .. .. .. .. £7,303,941

Average charge per annum upon 27 tramway undertakings (including interest on annual instalments) £7,303,941 ÷ 30 = .. .. .. .. .. £243,465

Average number of cars in use daily .. .. 3,996

Average charge per annum per car = .. .. .. £61
(£243,465 ÷ 3,996 = £61.)

## DISCUSSION ON MR. HAMILTON'S PAPER.

The PRESIDENT: I think you will agree it is quite appropriate that we should ask a gentleman who is intimately acquainted with the motor 'bus question to open the discussion. The Council have asked Alderman Littler, of West Ham, to be good enough to do so, and he has kindly agreed.

Alderman H. W. LITTLER (chairman, West Ham Tramways Committee): I think we ought very heartily to thank Mr Hamilton for placing before us a paper of such great importance. (Hear, hear.) We as representing the municipalities of the country ought to congratulate ourselves on the large amount of information and useful knowledge he has placed before us. In dealing with the question from our point of view as municipal representatives, there is one aspect which does need emphasising, at any rate so far as the London area is concerned. Mr. Hamilton referred to it two or three times, but I am justified in trying to emphasise it further; that is the great difference there is in the safety of the users of the streets when you use tramways as compared with motor 'buses. (Hear, hear.) This Association must approach the subject from the point of view very largely of the safety of the public, and if I may repeat my own words, which I used in a letter I wrote to the *Municipal Journal* some time back, in speaking of motor 'bus traffic: "The vital issue is whether London traffic is to imply unnecessary sacrifice of life and the complete surrender of the right of the private individual on the highway to the usurpation of the bully of the road—the motor bus," which was once very appropriately described by an ex-president of this Association as a "liver-jerking oil can on wheels." I do not know whether, since he has accepted salvation in a petrol tank, he would speak quite so disrespectfully. (Laughter.) In 1868 the first private tramway Bill was brought before Parliament, and was referred to in Mr. Fenton's paper yesterday. In 1870 the charter of the tramways passed through the House, and it is owing to that Act that we have received all our blessings, but also owing to the defects in that Act, or rather its being so much out of date, that a large number of our curses rest on our shoulders to-day. (Hear, hear.) The principal of these are road maintenance, rating, the unfair burden of street widenings, and, generally, the unfair conditions which have been emphasised in the paper. In 1876 in London we had 61 route miles of tramways, out of a total in the country of 196 miles, and I would like briefly to run over the three periods of tramways to point out what tramways have done in the country as a whole, and what they are doing to-day, and then to wonder why it is that the unthinking public are trying to make it appear, that it is time tramways were scrapped, and something newer put upon the roads. Taking the Board of Trade returns for 1879, we get these particulars: route miles open, 321; total number of passengers carried 151 millions; miles run by cars, nearly 20 millions; percentage of working expenses to gross receipts at that time, 83 per cent; passengers carried per mile of route open, roughly 500,000; passengers carried per car-mile, 7·77; average receipts per passenger, 1·84d. From that date forward various methods of traction were tried, but if we take the returns for 1898—which the Board of Trade described as the "steam period"—we find there is a wonderful development in the tramways. The miles of route open were 1,064; total number of passengers carried, nearly 900 millions; miles run by cars, over 90 millions; percentage of working expenses to gross receipts, 70 per cent; which is a very considerable drop from the previous period; passengers carried per mile of route open, 800,000; passengers carried per car-mile, 9·84; average receipts per passenger, 1·23d. Thus in that period you will see that the public received a very material benefit in the large reduction in the average charge per passenger. The increases which occurred in that period are, in mileage 231 per cent passengers carried 468 per cent, and passengers carried per mile of route open 72 per cent.

Taking the electric period of the past year, we find that the tramway track open was 2,637 miles, carrying passengers to the number of 3,127 millions odd. The miles run by the cars were 323 millions odd, and the percentage of working expenses to gross receipts was down to 60·6 per cent. The passengers carried per mile of route open were 1,183,000; the passsengers carried per car-mile, 9·67, and the average receipts per passenger 1·079d., with this added factor, that the relief of rates amounted to £488,000. I will not go over the increases, but my reason for giving these figures is this. Can anyone suggest seriously, with a huge organisation spread over the country, and providing such an enormous amount of convenience as these figures show, that the time for scrapping them—which seems to be the dream of one section of the Press—is anything like approaching? The amount of capital sunk in the tramways is somewhere about £77,000,000. One feature of tramways which I think has helped to develop them has been the facilities for inter-running, which commenced in 1904. Unfortunately, in London there was a mistaken policy on the part of the London County Council and one or two of the surrounding areas in opposing inter-running. Fortunately the position is entirely altered to-day, and with one exception the whole of the group of tramways on the eastward side of London have the fullest inter-running facilities; and I think I am justified in saying that, wherever inter-running has taken place, the results have proved satisfactory to the operators, and improved the earning value of the cars on every road where it has been done. There is no doubt that, had inter-running in London been introduced at an earlier date, a very large percentage of the passengers at present carried by the 'bus company which runs through our area would never have been in their hands. That that traffic has been appropriated by the 'buses is due, in my opinion, largely to the fact that we did not make provision to deal with it ourselves. I have a few figures with regard to the present tramways operating in the metropolitan area. I find that the municipal tramways operating around London have 200 miles of route open. The total number of passengers carried is 640,000,000; miles run by the cars, nearly 60,000,000; percentage of working expenses to gross receipts, 72 per cent.; passengers carried per mile of route open, 3,107,000; passengers carried per car-mile, 10·67; and the average receipts per passenger are down to one penny. Taking the undertakings of the companies operating around London, we find that they have 123 miles of route open, carrying 100,000,000 passengers. The miles run are 22,000,000, and the percentage of working expenses is 63. The passengers carried per mile of route open are 1,302,000, and the passengers carried per car-mile 7·29. Their average earnings per passenger are 1·25d. There you will notice that of the work done and the routes open, the municipalities are providing far more accommodation, and carrying far more passengers, but they have to do it at a farthing per passenger less. If we could get that extra farthing and give the same satisfaction to the public, I am sure the whole of the metropolitan tramways at the present time would be very grateful.

I should like to put before you one other thing, as far as we can get it—what is being done by the 'bus companies? I believe they are working about 300 miles of route. The estimated total number of passengers carried is 640 millions, and the miles run by the 'buses 65 millions.

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We cannot get any figures, though we made strenuous efforts to do so, as to what their expenses are compared with their gross receipts. The passengers carried per mile of route—and, of course, these are all estimated figures—are 2,130,000, and the passengers per 'bus mile 9 8. Apparently the average return per passenger is 1·32d. It has been suggested by Mr. Beaumont—and Mr. Hamilton brings it out in his paper—that the tramways should now make place for something newer, apparently motor 'buses. But I will take one typical day in December last, and give a comparison of the number of tramcars and 'buses which crossed over Bow Bridge, which is just on the dividing point between our area and the London County Council area. There were no less than 89 cars per hour, carrying an average of 20½ passengers per car. There were 87 'buses per hour, carrying an average number of passengers of 14½ per 'bus. During that particular day the average highest number of passengers per car for any given hour was 49, and on the 'buses 31. I want to express that in a somewhat different method. 20½ passengers were carried by the tramcars for every single unit of danger in the streets (and I am treating both the tramcar and the 'bus as a unit of danger, as against the ordinary user of the highway); the 'buses carried 14½ passengers per unit of danger, but it must be remembered that the 'bus—as has been brought out by the Select Committee on Motor Traffic—is seven times more dangerous than a tramcar. Therefore, the proportion you get is 20½ passengers carried by a tramcar, as against 14½ by a 'bus with seven times the risk to human life, and we, as representing the public, have to take this point into consideration perhaps more closely than is necessary by the commercial fare hunter. Following up that point, I do not think I can do better than read a report which is in a report to the London County Council of May 14, 1912. I find, taking it roughly, that although the figures taken by the London County Council are over districts quite different from Bow Bridge which I have been dealing with, that the proportion of 'buses and tramcars works out much the same. There is one other point I may refer to before I read the London County Council report, that is, that if the tramways are to be removed from that road, and to be replaced by 'buses, you would have the original 87 'buses at that point, plus 178 'buses to replace the tramcars, which would mean 265 'buses per hour passing over that one particular point. So that I shall not be accused of making out the case unfairly against the 'buses. I have allowed that all the 'buses would run practically full; that gives you the figure of 228 'buses per hour at this one point. That road carries some of the heaviest traffic outward from London. Can anybody reasonably propose that the tramcars should, for any reason whatever, be taken off the streets, if you are to maintain the transit facilities for the people of the area, and replaced by 'buses? It simply means that the congestion would be so terrific as to be outside all reasonable consideration. Mr. Hamilton asks whether the figure is taken both ways. Yes. It is five a minute, and the service of 'buses and tramcars has been largely augmented. The report of the London County Council I was going to refer to runs in this way:

"If electric cars were entirely withdrawn and the same seating accommodation had to be provided by motor omnibuses as is now provided by tramcars, 2,688 omnibuses, or an increase of 114 per cent. of vehicles over the number of tramcars would be required during fine weather, while during inclement weather, when only the inside seats of omnibuses are fit to be used, 5,712 omnibuses, or an increase of 354 per cent. would be required. The Walworth Road route may be taken as an instance of the addition which would be made to the congestion of the streets if omnibuses were entirely to take the place of tramcars. During the busy period of each weekday morning 70 omnibuses and 100 tramcars pass any given point in Walworth Road in one hour. If the electric cars were withdrawn and the same accommodation were given by omnibuses, the result would be, on a dry morning, 284 omnibuses an hour and on a wet morning 603 omnibuses an hour. At the present there is a tramcar every 141 yards; with 284 omnibuses there would be one of these vehicles every 50 yards; with 603 there would be an omnibus every 23 yards in each direction. This calculation is based on a speed of eight miles an hour, a speed which could hardly be exceeded even if it were practically possible to run such a service of omnibuses."

My reason for emphasising this point is this, that there has been for a considerable time a definite campaign in favour of what may be bluntly described as the scrapping of the tramways of London. I think the figures with regard to Bow Bridge and the report of the London County Council show the absolute impossibility of such a position ever coming about with regard to London. (Hear, hear.) The trackless trolley system I do not propose to deal with at all. You have several examples of it round here, but from London's point of view I think it may be practically considered as unsuitable. We could not run them in our heavy congested areas.

There is one thing which may be of interest to you, although I do not personally know anything of it. I had information supplied me the morning I came away with regard to a proposal for a storage battery tramcar. Mr. Hamilton suggested that such a thing is impracticable, but as it may be of interest to you I can give you the figures of the estimate put forward by the storage battery firm in their proposals to the town of Morecambe. The seating capacity of the car is 34 outside and 22 inside. The total weight of the car is ten tons, and the extra allowance for passengers is four tons. The speed is ten miles per hour, the battery is estimated to cost £650, and the weight of the battery is 1·2 tons. The battery consists of 120 Type A.C. Edison cells, and the car batteries it is suggested should be charged at night time, with an extra boosting pressure towards the end of the loading up. The two motors are of 15 H.P. each, with seven-speed control, brakes, and other details. The cost per car is £1,350. Those are suggestions which have been recently made. If any of you are looking for anything in that direction you may find those figures informative. (Laughter.) There is one other point which does need emphasising, and that is that the maintenance of the roadways at the present time is one of the heavy burdens on tramways in the London area. There seems to be some objection to the idea of putting a tax on other users of the road, or re-establishing the old wheel tax, but I think during the last session the Government have given the principle completely away, because with regard to trolley 'buses, and in some cases motor 'buses, they have established the principle that where those are run by one authority outside their own area they shall contribute something towards the maintenance of the streets for damage done: ⅜d. is the figure which is being put into some of the bills, and there is one important point in addition to that. It is that the road authority at the end of three years shall have the right of review for the purpose of amending the contribution if it is not found to be sufficient. That, I believe, does not apply in every case, but it does in re-rating. I am representing London areas, and another point is this: Give us the position as it was a few months back, when we were being rated as light railways only to the extent of one-fourth—and I believe the tramcars in and around London, though they are showing a deficit at the present time, could satisfactorily compete with the whole of the 'bus traffic, and infinitely better meet the demands of the public than the 'buses can possibly do. We are more capable of bearing overload at times of pressure, and on the question of safety there is no need to compare the two things at all. There are in Mr. Hamilton's paper many more points which I should like to have dealt with, but I feel I have taken up more time than is justified, and I will close by thanking Mr. Hamilton very sincerely personally—and I am sure you will endorse it—for his able paper. The information there contained will be of material service to us, both in London and throughout the country. (Applause.)

The PRESIDENT: I think you will agree that in Mr. Hamilton's paper there is some very straight talk on the practical question of motor omnibuses. We have with us to-day, in addition to the visitors, Mr. Worby Beaumont, the technical adviser to the Commissioner of Metropolitan Police. He has kindly consented to speak, and I am sure you will be pleased to hear him.

Mr. W. WORBY BEAUMONT: I wish to thank you and your Council for sending me the invitation which enables me to be present this morning. Now, with regard to this paper, after hearing Mr. Fearnley's address, I felt it was hardly necessary for me to enter into a discussion on the paper at all, inasmuch as a large part of the whole of the contentions—apart from the figures, or rather from the interpretation of figures which Mr. Hamilton uses—has been answered by the remarks in Mr. Fearnley's address. Mr. Fearnley practically points out to you that you have not to consider only tramcars or omnibuses, but you have to consider the whole problem of the conduct of passenger traffic, and the whole of the other traffic to be conducted in any one city which you have to deal with. (Hear, hear.) Now, it appears to me that Mr. Hamilton has fallen into the error of thinking only, or rather of confining his vision only to his one prospect or purpose, and his hearing to the intelligence of the voices that have only one tune, and I think it is not necessary to go further into his paper than to begin at that point wherein he gives some incomplete quotations from a recent paper of mine. He says, "There is no doubt that considerable improvements in lightness and reliability have been embodied in the later forms of petrol omnibus traction as operated in London. In many quarters advocates of the motor 'bus have, without fully considering the matter, enthusiastically hailed this form of traction as the dawn of a new era in street transit," and many are assuming that the tramways are henceforth to be considered as back numbers. He then quotes, or mentions some remarks somewhat to that effect, by Lord Montagu, and refers to the paper of mine which I have just mentioned. Now, there is nothing in any paper I have ever written, or any remarks I have ever made, that lead me to condemn tramways as henceforth back numbers as a whole. I know very few places, towns or cities—London or any other—in parts of which tramways are not the best means of transit, but I know of a great many wherein the tramway is not the best means of transit. I am, therefore, not of opinion that tramways are as a whole to be considered as back numbers, and anyone who says that must forget that the same sort of thing was said within our lifetime with regard to candles. Later it was said with regard to gas, and later it was said with regard to electric lighting. But we are using them all, and not one of those industries, not even the candle maker, has been killed. With regard to the quotation from my paper, Mr. Hamilton says I consider that "due to the introduction of a light, high-speed internal-combustion motor, the advantage of rails in the streets has



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almost completely disappeared." Allow me, if I may, to read the paragraph from which that is taken.

> "It is necessary to remind those interested in this subject that the original reason for the introduction of the tramways, which have become railways in the streets, was the smaller traction resistance on rails as compared with the traction resistance on the then common roads. That smaller traction resistance was then of much importance, because passenger transport on the highways was by means of horse haulage. Since that date two great or changing facts have come into action, firstly, electric power and the invention of the light, high-speed internal combustion motor have made traction resistance of comparatively small importance; secondly, the economic value of good roads for all classes of vehicle—public, private, motor, and horse—has caused general recognition of the importance of road improvement, and this, while it is attended with economy in road construction and maintainance, is further attended by a great reduction in the average traction resistance, so that the advantage which the rails had in the streets has almost completely disappeared, while the disadvantages where general traffic is great, have increased."

I contend that that paragraph is absolutely correct, especially with regard to London and London traffic, to which my paper was chiefly referring. Mr. Hamilton has further quoted from that paper, but quotations, I think, should be complete whole sentences or paragraphs, and not portions of them. (Hear, hear.) Mr. Hamilton also refers to a paper by Mr. W. Y. Lewis, read before the Society of Engineers. He quotes from Mr. Lewis, but what he quotes is only a general statement that every kind of way in existence is nearly equally bad, and that the system which Mr. Lewis was proposing should be better than everything else. The paragraph is only one which shows that Mr. Lewis damned the sins that he cared not for, and supported only the one that was his pet. Referring to me again, Mr. Hamilton says: "Mr. Beaumont rises above all sordid considerations of £ s. d.," and disregards various things. Personally, I do not see the necessity for saying that, and, secondly, it is not true. (Laughter.)

I have said that in some cases certain forms of traffic cost more than others, but that the cost is not the first consideration. That is to say, all those who are tramway engineers, and chiefly or particularly interested in tramways, must not look always at the tramcar and the tramway as though the only aspect concerning it was whether it, as a machine, was going to be a paying machine, disregarding all other considerations. It is quite possible that some of the arguments I have just heard from Mr. Littler might be perfectly true, if there were only one consideration with regard to traffic in London, namely, the possible paying results of the tramcars and the rails. But as Mr. Hamilton admits in several parts of his paper, the traffic of narrow streets and the possibities of narrow streets must be considered, the result being, for instance in London, that there are numerous streets where the traffic is so great—and he admits that is the reason as well as narrowness—that tramways could not be permitted, and will not be permitted. If that is the case—and he admits it—that reasoning should be applied, not only to the streets of London, but to other towns where anything like similar conditions exist. I admit that the greater part of the traffic of London is unparalleled, and one cannot help remembering on going to various places abroad, and seeing the various tramways and tramcars to which appeal has been made by many of those who have gone abroad for different Corporations, that when they come home they say "This and that kind of thing is used abroad, and it will suit us perfectly, but we must have this and that." But taking any one of a number of places in Belgium, France, or Germany, you will find traffic which is nowhere anything like that of the greater part of London; all of it is conducted so far as tramways are concerned in single-deck cars, and the speeds nowhere approach those quite common in London with its heavy cars. The reasons for the success in any one of those foreign towns are not all of them applicable by a great deal to the heavy vehicles and the heavy and dense traffic of London streets. I have made several notes on Mr. Hamilton's paper, and I find that he has charged me in one place with not having given figures. Now, there is an old adage with regard to what figures may do, and even if I had prepared any I should have felt, after I had heard Mr. Hamilton read his paper and make the corrections he did as he went along, that the interpretations from any figures I might give—just as they will be from any Mr. Hamilton has given, and those Mr. Littler has given—might be as various as the interpretations of theirs. (Laughter.)

There is one point with regard to costs. It would take a paper to reply to this table which Mr. Hamilton gives of the costs on page 18 of the paper, and there is no doubt that many would very much like to have some of the detailed figures that are in the hands of a few with regard to omnibuses. But to give figures with regard to the cost of running 3,000 omnibuses in London would only be to mislead anyone who thought of running 30 omnibuses in the country or somewhere else. Therefore, I say in dealing with figures like that it is only misleading to give any such set of figures. It would, as I have said, need a paper to deal with the subject. Now, Mr. Hamilton has given those figures with regard to omnibuses, and given a lot of figures with regard to tramcars. But really he admits himself in various parts of the paper how extremely difficult it is to give anything like averages that are a truthful representation of particular cases. He has mentioned, it is true, that tramways in many places are earning big profits, etc., but I did not notice that he said that about 26 per cent of those referred to in the tables frequently published by THE TRAMWAY AND RAILWAY WORLD are either making no profit at all, or calling upon the rates to make up the deficiencies. In conclusion, there is perhaps one point with regard to Mr. Littler's statement about the dangers of the omnibus, with which I might deal. There again figures are misleading. It is true that something like seven times the number of fatal accidents were attributed to motor omnibuses as to tramcars in London. It is not, however, true, that the omnibuses are necessarily seven times more dangerous than the tramcars. Although I know it is a heavy task to suggest, if Mr. Hamilton or Mr. Littler will read over parts of the evidence given before the Motor Accidents Committee—at all events it was that when it started—he will find a very great deal that will make him hesitate before he again gives even those figures. I wish not in the least degree to be disrespectful to Mr. Hamilton, for I know he has intended to give you a paper of real value, but in conclusion I would say—though I do not care more about motor omnibuses, or tramcars, or trolleys, except as a general traffic question—that I hope Mr. Hamilton will soon get over his attack of "motorphobia." (Laughter and cheers.) There is one other little matter. Mr. Hamilton describes me as the technical adviser to the associated London omnibus companies. It should not be that, sir, but technical adviser to the Commissioner of Police of the Metropolis.

The PRESIDENT: Yes, we will make that correction.

Alderman F. SMITH (Liverpool Corporation Tramways Committee): Thank you, Mr, President, for calling on me, but I really feel after the three first speakers have taken the enormous time they have—we have over 100 gentlemen coming from all over the country, full of information and enthusiasm—it is rather hard those gentlemen should be detained by any observations of mine. I myself thank Mr. Hamilton for his very capable paper, and the trouble he has taken in putting the facts together, but what are you faced with? You are faced with a serious competition and we are going to give 20 minutes to the whole hundred gentlemen for the consideration of it. Bad business. (Hear, hear.) I am downright glad that London is fairly up against a stiff proposition—they have got motor 'buses there, and they jolly well deserve them. Against all the advice that could be tendered to them, they incurred a huge capital expenditure; they have run the thing sentimentally from many points of view, and they are now getting hurt and deserve it. It will brighten them up. I remember when I was at a dinner a little while ago, a man who was proposing the toast with which my name was coupled, said he was proposing the toast of the "chairman of the slow-moving vehicles in Liverpool." (Laughter.) We ought to move our tramcars quicker, we ought to abandon sentiment and become what Alderman Littler described as "fare-hunters"—that is what we are out for—tempered with due regard to the needs of the people whose interests it is that we should properly serve. But when you come to a paper like the one we had yesterday from Leicester, and see the way in which they laud us with sentiment, and get things quoted against us—I am reading from the paper—"Poor blind and crippled persons residing in the borough are carried free of charge, but the Corporation accept no liability for third party accidents, an indemnity being given by the local philanthropic societies against third party risks." (Laughter.) What are the facts justifying that statement which, mind you, has been hurled at us?

A MEMBER: On a point of order, sir, is Mr. Smith discussing the paper?

Alderman SMITH: I am a Leicestershire man. I am dealing now with a phase of traffic that injures us.

The PRESIDENT: Will you deal with Mr. Hamilton's paper, please?

Alderman SMITH: I am dealing with the subject of Mr. Hamilton's paper. If you want me to read extracts from Mr. Hamilton's paper I am right off. We have had it circulated amongst us, and we have had an exhaustive 30 or 40 minutes' summary. I am going to make my point clear, if you will permit me to do so. We find they carry 32,907,795 passengers in Leicester, and only 103 passes have been issued to the blind, and 98 to cripples.

The PRESIDENT: It is Mr. Hamilton's paper I want you to discuss.

Alderman SMITH: We are up against the whole subject—the discussion is up against the whole question, and how sentimentally or otherwise we are handling our trams. We shall have undoubtedly strong opposition such as we deserve in places where the motor 'buses can get in and serve a remarkably useful purpose. We have got to abandon other than proper commercial methods, tempered with due regard to the interests of the municipality, if we are going to live. I do not believe that the tramcars will be ended, but I do believe that there is a great likelihood of them being handed over to commercial people to run as a commercial proposition. If motor 'buses go on as they are likely to go, daily and almost hourly improving, they will run us commercially off the road when municipally we carry men 14 miles for 2d. Those are the points that I want considered. I am old enough to remember a dog cart literally drawn by a dog, and an ox drawing a cart; and with electric cars we have knocked out the

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horse drawn tramcar; we have knocked out a great many of the cabs; we have knocked out horse traffic. Now the advance of science has brought to us a strong competitor, which we have solidly and seriously to consider But generally you are in a hilarious mood, and something amuses you far more than it amuses me. I feel bitterly, I have spent two days here to listen to the papers that have been read after having been already circulated, and all you gentlemen, I say packed with information, packed with local knowledge, are unable to express your opinions. I should move if it were any use—I know it is not—that the whole of the afternoon be given to you gentlemen for discussion, so as not to miss a chance of saying something on this important paper.

Mr. A. Baker (Birmingham Corporation Tramways Committee): I think that we shall all agree that this paper is one of the utmost importance to tramway operators, and I have heard it seriously suggested, even before Alderman F. Smith spoke, that it would perhaps be advisable and acceptable to a good many of our members if this discussion could be continued during the afternoon. That, of course, is a matter for the meeting to decide. But while I beg to thank Mr. Hamilton for his paper, and also for the very useful information it contains, some of which will be most valuable in refuting arguments in favour of motor omnibuses against tramcars, and while I agree that the time has not yet arrived when motor omnibuses are likely to supersede tramways, I do wish to utter one word of warning against an error that we may fall into, and that is, that we may feel that tramways are going to serve the situation for all time. Now, I have been connected with tramways, as many of my friends and colleagues know, for more than 30 years, but I should feel it a very great mistake if I came to the conclusion that tramways were going to fill the bill for all time. All scientific history is against it; we have only to think of aeroplanes and Marconi telegraphs, surely, to kill an idea of that kind. What we have, as municipalities, to consider is the best means of serving the traffic problem, whether by motor 'buses, tramcars, or aeroplanes, if you like. Our first duty is to maintain the control of our streets, and to be the supreme traffic authority, whether by tramcar, motor 'bus, or any other means of locomotion. I feel myself that although at the present time tramways are not likely to be superseded, we must not shut our eyes to the fact that inventions may come along that may even put tramways in the shade at some future date, and therefore it behoves us as tramway men in the interests of our respective Corporations to keep our eyes open on coming events, and to be right up-to-date in all scientific improvements in regard to the carriage of passengers in our streets. That is all I have to sav in three minutes. (Applause.)

Councillor H. Heather (chairman, Leyton Tramways Committee): I represent one of those districts contiguous to Alderman Littler's, Leyton, and I would like to emphasise and bring the feeling of this meeting back again to the question of the equality of treatment, which, although it has been touched upon this morning, I do not think has been adequately discussed. And I, for one, should be glad to come here this afternoon and give up going to visit the works I had thought of going to, because it is a subject of extreme importance to us upon the environs of London. Some of you will remember that at last year's Conference at West Ham, I ventured to say in regard to this equality of treatment, that human ingenuity would find a means whereby the present condition of things in London and its environments would be extended to the great urban districts of the country. (Hear, hear.) I know that I was met with cries of "No, no," but I have heard recently that the great London combine and a proposed provincial company intend to move Parliament to get those very powers that the provincial towns have of licensing the public vehicles in your streets and towns—that those powers shall be taken away from those cities and towns, and that they shall be vested in a central office in London, or shall be controlled from London, through Home Office representatives, in your towns and cities. I have been told that that is a secret, undercurrent object which the great London combine, with another company that has been mooted, will be going for. Now, I can imagine, gentlemen, when such a proposition comes before you as a concrete proposition, coming before Parliament, the tones of indignation with which it would be assailed by all you gentlemen who come from districts other than those in London. I can imagine in what glowing terms you would describe the injustice of such a thing, that it could not possibly be allowed; you would move heaven and earth to wipe that or any such proposal off the face of the earth. You would seek your own Members of Parliament. I can imagine the feelings with which such a proposal would be received, and I know how you would lobby your own Members of Parliament in the House of Commons. You would send your representatives up to Westminster to do a good deal of lobbying; you would look to local influences, and you would get to play very soon a concensus of opinion that such a thing could not be allowed. And why? Because of its inherent injustice. You would contend that the control of the traffic should be in the hands of the representatives of the people on the spot. Now, if the proposal would be an injustice to Birmingham, to Glasgow, to Leeds, to Hull, to Bradford, and all those other cities, is it not an equal injustice to our urban areas round about London? (Hear, hear.) What differentiates the principle of justice as between a town that is on the environs of London and one that may be 20 miles away? The place I represent—Leyton—I know is a small part of London. It is a mere nothing, but it has 128,000 inhabitants. I reckon if some of you had 128,000 inhabitants you would reckon yourself a very fine, big, and important place. We are humble, we are next door to and are smothered by London—that is the long and the short of it, but we have the honour of belonging to London, and we have this very great disadvantage—and it is a disadvantage. My point is this—if it would be an injustice to impose this burden upon your provincial cities, how is it that we allow this injustice to be continued in the environs of London?

A Member: Because you belong to London.

Mr. Heather: But that does not make it more justice. I thought justice was impartial. I thought justice was high above party and above districts—that wherever you were you would get the same measure of justice meted out to you. How has it affected us in my area and two or three others? I have some figures here. Croydon has dropped from a profit of £17,304 in 1912 to a profit of £10,586 for the year ending April, 1913; I am told it is going to be very much less if anything at all in the next year. Ilford dropped from a profit of £786 to a loss of £2,015; Leyton from a profit of £3,086 to a loss of £812, and this year it will be vastly different again on the wrong side, approaching £4,000.

A Member—Bad management.

Mr. Heather: A member says bad management. Well, he is not serious. You all know how the London County Council figures have dropped from a profit of £240,630 to a profit of £497. Walthamstow dropped from a profit of £4,496 to a loss of £2,800; West Ham, from a profit of £4,527 to £3,388 loss. Now my point is this. Here are these great losses, great to us. You will get the same thing if any such conditions prevail in your own areas And there is this proposal, this insidious proposal, which will come along, whereby the injustice which is meted out to us in the London areas shall be spread out all over the country. Now, I say to you if you are wise, if the Conference is wise, you will go back to your towns and cities and help us in the London areas to get equality of treatment—that is all—equality. We do not say abolish the 'buses, the 'buses must be there, they are needed for London, absolutely needed for London, there is no question about that. I have heard of their being wiped off the face of the earth; that is nonsense. They are there and they will stay and get to be profitable, but I say mete out to us in regard to road maintenance, in regard to rating and other things equality of treatment. Do for goodness sake agitate, agitate, agitate, and get equality of conditions, and then we can do well. (Applause).

Alderman J. Trumble, J.P. (Croydon Tramways Committee): I congratulate Mr. Baker on his really sensible speech after the two long speeches we had. The question of Mr. Hamilton's paper was as to the best means of providing for urban traffic, and surely there is one point that has been omitted from every speech, and that is the public, who are the best judges. And you find in London and other places that a large proportion of the public do prefer to ride in motor 'buses to the trams. We cannot help acknowledging that difficulty. Whatever may be given to towns we should have to consider the wishes of the public, and they are really the final arbitrators on the question as to which is best, because the people will have exactly what they want, even if they are losing a farthing in the £ on the rates.

Mr. C. J. Spencer (general manager, Bradford Corporation Tramways): May I say one word? It seems to me in this controversy there is a tendency among tramwaymen to urge the glories of the past history of tramways as a reason why people to-day should not use motor 'buses. On the face of it, that seems to me to be a very poor defence of tramways, and is weakening in its effect. Surely our case is strong enough. Mr. Hamilton gave you an excellent paper. I think the figures have not been touched upon by any speaker. That is our case—not because we have spent a lot of money on our tramways, not because we have a glorious past, but because we believe we are the fittest people to carry the people to-day. On the point of the last speaker, he says the public are the judges. True. Remember the sure thing to-day, especially in London, is this—the 'bus comes there. and it is taking the cream of the traffic, leaving the skim milk for the tramways. Never so far as I know has a 'bus company taken on a town of any considerable size and proved that it is as efficient as a tramway, when the tramway is not there.

The President: I am sorry to have to close the discussion. I think it is impossible to accept the suggestion of continuing this afternoon, for this reason: 110 or 120 gentlemen have made engagements to visit various firms, and I think we are in honour bound to keep those engagements. I ask you to give a very hearty vote of thanks to Mr. Hamilton for his paper, which has provoked this important discussion, and I have to say he will be pleased to reply in writing to the various points which have been raised, and if any gentleman would like to make a further point, or anyone who has not spoken would send his views in writing to Mr. Hamilton, he will deal with it in his reply.

The vote of thanks was carried with acclamation, and the Conference closed.

[Mr. Hamilton's reply has been received since the Conference, and is given on the following page.]

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## MR. HAMILTON'S REPLY TO DISCUSSION ON HIS PAPER.

Mr. President and members of the Association,—I regret the time at the disposal of the Association did not permit of my replying briefly before the Conference concluded. It is also a deeply regrettable fact that the time arranged for discussion of the paper was so inadequate, with the result that it was not possible for the opinions of many members, both official and members of Council, to be ventilated.

So many expressions of a desire to continue the discussion at some future time were made on the following day at the annual meeting, that I wish to repeat the statement I made there, viz., that I shall be very pleased, if asked by the Executive Committee, to raise the question again, if necessary, with any supplementary matter which may be available. A periodical review of the prevalent method of passenger traction in cities, and a comparison with other forms, is of the utmost importance, now and at all times, to the great municipalities of the country, and to all investors in tramway undertakings.

I should like to thank the previous speakers for the extremely kind expressions of their views in connection with the paper. I think their appreciative acceptance of the matter, however, is largely due to the importance of the subject, rather than to the way in which it was presented. I regret that the claims upon my time prevented the completion of the paper, and its issue to the members, until the week preceding the Conference.

Mr. Littler placed his views before the meeting at considerable length, and perhaps in some degree travelled over the same ground as I had found it necessary to do. The question, however, of Tramways *v.* Motor 'Buses is so extremely urgent in London and surrounding districts, that he was fully justified in putting on record the interesting particulars, even if they somewhat overlapped, upon which he based his deduction and arguments. They will be found to be most interesting reading. The text of his remarks, and also those of Mr. Councillor H. Heather, really present a special aspect of the question, and an opportunity for its discussion at a suitable and early date should be provided by the Association.

The assistance of the Municipal Tramways Association should be afforded to the various metropolitan municipal tramway undertakings, all of whom at the present time are being seriously affected by the inequality of conditions under which tramways and motor omnibuses are being operated. I commend to their serious consideration the remarks of those who spoke representing the London districts.

Mr. Worby Beaumont, who as the guest of the Association and the writer of a recent paper on "Urban Passenger Transport in Cities" was asked to speak on the matter, in my view seemed to shirk the task of making any serious criticism of the facts and figures relating to tramways and motor 'buses which I placed before the Conference.

His first remarks were that Mr. Fearnley's address rendered it hardly necessary for him to enter into a discussion of the paper at all. I fail to find in any portion of the presidential address the slightest suggestion that any figures and deductions in my paper were in the slightest degree incorrect. As a matter of fact, before writing the paper I communicated with the President, and he agreed that in accepting the figure of 10d. per 'bus-mile I should be in general concurrence with his very limited experience of new motor 'buses.

It is not, of course, considered to be the right thing to criticise the President's address in any way, but as it has been quoted against me I think I may fairly claim that his views were entirely in agreement with the general survey of the situation which I placed before the Association.

If Mr. Beaumont refers to Mr. Fearnley's personal views relating to the possibility of an interesting and valuable experiment being carried out "somewhere" by substituting motor 'buses for tramcars on some route which requires renewals of rail, then I refer him to the further remark in which Mr. Fearnley says: "If the motor or trolley vehicle is anything approaching in its completeness, reliability, and capacity the claims put forward by its advocates, what hesitation need there be in adopting such a course?"

Further, as tracks are wearing out in Sheffield quite frequently, and as Mr. Fearnley, so far as I am aware, has never made any proposal of this kind to the Sheffield Corporation, his views must be held to be in entire agreement with the summing up of the paper. I am sure everyone would be much interested to see the result of such an experiment when Mr. Fearnley has sufficient confidence to make the suggestion and the Corporation of Sheffield the necessary courage to carry it out.

Mr. Beaumont now states that his paper chiefly referred to London and London traffic. Since then I have again gone carefully through his paper, which is "A Note on Road Passenger Transport in Cities," and must disagree that he has confined his observations in any way to London. "London," he says, "is perhaps an extreme case, but there are several cities or towns in which the tramways have become an incubus."

As an earnest searcher after the truth, I endeavoured to look on the matter under consideration with an open mind, and to give effect only to facts and figures which my experience and the experience of others throughout the country had proved to be correct. I was, therefore, deeply disappointed to find that the principal exponent of motor 'buses at this gathering had no criticism to offer on the deductions, and no figures of his own to put forward, but simply repeated the stereotyped sneer as to what figures may do. I feel sure that Mr. Beaumont, after reading his remarks as I have done, will feel that a champion of the motor 'bus must be better equipped with facts and figures before he can expect that his statements can be accepted by the members of the Municipal Tramways Association and the public generally.

The one figure upon which Mr. Beaumont did venture was that whilst I referred to the tramways which had big profits, I did not take any notice of the 26 per cent. of those referred to in the tables frequently published by THE TRAMWAY AND RAILWAY WORLD which were making no profit at all, or calling upon the rates to make up their deficiency. I have gone most carefully through the records of THE TRAMWAY AND RAILWAY WORLD, and find that the details of 83 undertakings are frequently published there. Of this number there are 13, *i.e.*, 15·7 per cent., which show a deficiency on the year's working, and 5, *i.e.*, 6 per cent., which show no deficit and no surplus. The total of these two is 21·7 per cent.

In the Board of Trade return for 1911-12, there are 172 tramway undertakings which are owned by local authorities. Of that number there are 22, or 13 per cent., which require rate relief. These are very different figures from the 26 per cent. referred to by Mr. Beaumont, and it may be questioned whether, if full consideration were given to the rates provided from the operation of the lines and the value of the road surface maintained by the different undertakings taken into account, it might not be shown that in many of these cases there was a profit instead of a deficit on their working.

I have applied the general figures used in my paper to the cases of the 22 towns which are referred to in the Board of Trade return as having a deficit. I find that if credit is given for road maintenance and for rates, and also for profit on the price at which current is supplied to the tramways, the deficit of £62,000 per annum from the 22 undertakings is reduced to £12,315 per annum. On the other hand, if motor 'buses were installed—which seems to be the panacea proposed for the present deficit, then the loss, instead of being £12,315 per annum, would become a loss of £145,140.

Mr. Beaumont rather suggests that the statement as to the dangers of motor 'buses is exaggerated, and states that if Mr. Littler and I read over parts of the evidence given before the recent Committee on Motor Traffic, we should hesitate before relying on these figures. May I say I have read over the greater portion of the evidence given before the Motor Traffic Committee, and that my deductions as to the dangers of motor 'buses as compared with tramways are drawn from the official evidence of Colonel R. C. Hellard, head of the London Traffic Branch of the Board of Trade. He states, in answer to query 16,725, that the number killed per million passengers on tramcars is ·041, whilst the number killed per million passengers on motor 'buses is ·290. These figures are surely above any question.

May I say that, on the whole, whilst I appreciate very much Mr. Beaumont's courtesy in referring to the paper and myself, I was deeply disappointed to find that his remarks dealt in trifling observations with regard to extracts which I had made from his paper, and vague generalities, instead of really criticising the figures and deductions which I presented, or substituting some genuine solid views in opposition to these.

The other speakers are generally in agreement with the views I put forward, and their remarks speak for themselves. I agree with them that whatever the form of traction may be, the municipality should maintain the control of the streets.

Alderman Trumble, of Croydon, stated that the previous speakers and the writer of the paper had omitted one point, viz., that it is the public who are the best judges, and that you find in London and other places that a large proportion of the people prefer to ride in motor 'buses rather than in trams. I presume it is not possible to make the object for which a paper is written quite clear to everyone, but I thought the whole argument of the paper did show that if motor 'buses were run instead of tramcars in towns where it was possible to run either of them, the cost of travelling would be double that for trams. I have yet to find the public who are willing to pay a double fare instead of a single one, and this is the final result of the whole question.

The choice as between rail *v.* non-rail passenger transport in cities, when considered from every point of view, must be decided in favour of the former, which, with the many improvements in types of body, trucks, equipment, and rail construction, shows to-day no symptom of obsolescence.

## LUNCHEON ON THURSDAY.

The delegates and guests at the Conference were again entertained to luncheon on Thursday at the Royal Victoria Station Hotel by Sir William Clegg, J.P., chairman, and the members of the Tramways Committee of the Sheffield Corporation. The Right Hon. the Lord Mayor presided, and there was a large and distinguished company present, the public and business activities of the city being well represented.

The toast of "The King" having been duly honoured,

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Mr. W. J. SQUIRES (member of the Highways Committee of the London County Council) proposed the toast of "The Chairman and Members of the Sheffield Tramways Committee," saying: I have been asked to propose a toast which I venture to say will be received with acclamation. Let me at first say how sorry I am that the chairman of the Highways Committee of the London County Council, Sir Edward White, is not able to be with us this week. Sir Edward has had a very serious illness, and will have to be released from duty for something like two or three months more. When one is asked to give the toast of a committee of gentlemen like the Tramways Committee of Sheffield, it is almost like talking about oneself; but there is a slight difference between the Sheffield Tramways Committee and the London County Council Highways Committee. We have heard during the last day or two the very great advantages which you as provincial towns and cities have over the great metropolis, but to day we are here primarily to bear witness to what the Tramways Committee of Sheffield are able to do. First, let me say that hospitality seems a very great point of yours, and accommodation for the public is certainly one of the things you understand. Your tramway service in this city is excellent, and when you combine such things as business acumen so well with the social side, then you must have a very good Tramways Committee indeed. I think it is a regrettable thing that Sir William Clegg, the chairman of the Committee, is not with us. I express my very great sorrow that I have not had an opportunity of meeting him. I have read of Sir William Clegg and I have heard of him, but I have never had the pleasure of meeting him yet. I am always happy in Yorkshire, and possibly when I tell you one of the very great reasons for that you will say "No wonder." Yesterday was the celebration of the fortieth anniversary of my wedding day with a Yorkshire lady; I was married in 1873 just outside the city of York, and but for circumstances I should have had my wife with me to-day. But there are other reasons why I always feel at home in Yorkshire. A little while ago I was at Huddersfield attending another Conference of Building Societies, and there one thought of what the Yorkshiremen and Yorkshirewomen have uppermost in their minds. It is, I think, my friends, to make you happy. This Conference ought to be happy indeed. I have the pleasure to-day of not having to limit anything I may say in support of this toast. The President of the Municipal Tramways Association is on my left, and I am sure the Conference would not wish me to be limited, for I want, if I may, to compliment the Tramways Committee of Sheffield on what they have done and on what they are going to do. There are certain periodicals which are published which do give to us and to the world what the different tramway undertakings are able to do. Sheffield is in rather a unique position; you have taken a step which I suppose a great many other undertakings would like to imitate. You have added, I understand, a motor 'bus service to your tramways. I am not going to discuss that point this morning, and my only regret is that we were not able to finish the discussion of that important question at the Conference this morning. But Sheffield through its Tramways Committee is doing what other provincial towns and cities would like to do. Whether it is a right step for tramway authorities to take in utilising motor 'buses is a matter which you know best yourselves. But the success of the Sheffield tramways, and what I have seen of the Committee, show me that you must have a very unanimous and harmonious Committee: I hope it is so. I hope that the Sheffield Tramways Committee is very much like what we at the present moment are on the Highways Committtee of the London County Council. It was not always so, but unanimity of purpose irrespective of party or politics is the right course for a Tramways Committee or any committee of a great Corporation like this, and you are bound to get better work and the ratepayers will reap better benefit from such undertakings if that is the case. Now my Lord Mayor, I had the opportunity of saying a few words to you last evening; I congratulate you, sir, on having consented to preside over this gathering to-day. It is a very great pleasure to a Conference to know that the Lord Mayor of the city in which they are meeting in congress does grace their assemblies. I have known other places where it has not been possible to get the leading citizens to take any part whatever in a Conference; happily that is not so with Sheffield. We have received from the Corporation here, through the Lord Mayor, through the Tramways Committee and Aldermen and Councillors, everything that any man or woman could desire or expect. (Applause.) On behalf of the London County Council, as one of its delegates, may I tender to the Tramways Committee and the whole Corporation of Sheffield our best thanks for the kindness which you have proferred us. To them, through my humble self, on behalf of the members of the Conference, I think I can say this, that they are unanimous in passing this verdict, that Sheffield has risen to the occasion and has not been beaten by any other place in which we have ever held our Conference. (Loud applause.) I am not stretching a point when I give this expression of opinion—at Sheffield, at Leeds, at Bradford, and in many other parts of the country, a very noble example has been set, an example of going forward in municipal enterprise, and that is amplified to me in this city of Sheffield. There are representatives here from many other important centres, but I am sure they will not dispute my contention that Sheffield is showing an example of what municipal life should do and can do through its Tramways Committee, of which we happen to be the guests to-day, and is loyally and well doing that work or endeavouring to do that work to which the Corporation have put their hands. Let the Tramways Committee of Sheffield go on as they have been doing, and I feel sure of this, that the success of tramways, not only in Sheffield but in other parts of the country also, is not going to die out for some time to come. (Applause.) I have the honour to couple with this toast, the name of Alderman Bennett, a member of the Sheffield Tramways Committee. I have nothing more to add, but to thank the Committee for the opportunity given me of saying a few words, and I have on behalf of the Conference, of every member of the Conference, to thank Sheffield for the very hearty welcome which has been so generously accorded to us. (Loud applause.)

Alderman C. F. BENNETT (member of the Sheffield Tramways Committee), who was received with enthusiasm, in replying to the toast, said: No one feels more sorry this afternoon than I do at the absence of Sir William Clegg. Had Sir William been with us, I should have been a mere humble member of the Sheffield Tramways Committee present at our gathering this afternoon; as it is, I have to undertake a task which I know perfectly well he would have performed in a far better manner than I shall be able to do. That is, the task to thank the proposer of this toast for the generous way in which he has submitted it to you and for the kind things he has said about us, the Tramways Committee, and to thank all you ladies and gentlemen for the way in which you have received and responded to that toast. The proposer told us—and I was glad to hear his words—that our tramway service in Sheffield was an excellent one. I am bound to admit that we are perhaps a little bit proud of our tramway undertaking. I would like you to agree with me in saying that perhaps we are entitled to be a little bit proud of it. I must ask you to excuse me for taking up a few moments of your time, but I should like to refer to one of the causes to which we attribute that success to which you have been good enough to refer. In the first place, in our city we early decided the principle which every municipal tramway undertaking must decide at the beginning—as to whether or not our tramway system should be worked in the interests of cheap and rapid transit or in the interests of a profit-making concern for the benefit of and in aid of the rates of the city. We adopted what I think was the right course, and one which I think has been confirmed since by the action of many other municipalities. We said the right course was to work the tramway system in the interests of cheap fares, and that relief of the rates was only a secondary consideration, although an important one in connection with the work of municipal tramways. In the next place, we early adopted the principle of a penny universal fare. We adopted the penny system of fare from the centre of the town to any of the tramway termini on any of its boundaries where the tramways run without any regard whatever to the distance which that tramway covered. We think that has had something to do with the success which has attended our tramway system. We then followed the example of a great city in Scotland—I know we always follow a good example if we follow a Scotchman—we followed the example of the great city of Glasgow in adopting a system of halfpenny fares. I am not going to enlarge in any way on this system, more than to say that its adoption has been satisfactory. It has met with the approval of the Sheffield people, and from a financial point of view has been satisfactory to us as members of the Tramways Committee. I do not wish to trouble you with many figures, but last year we carried no fewer than 21,731,910 halfpenny passengers upon our tramways, and the receipts from those halfpenny passengers last year amounted to no less a sum than £45,274 16s. 3d. I think those figures alone will show you that in Sheffield at any rate the halfpenny tram fare has been a success, and has worked in a satisfactory manner. In addition to that, we early adopted what I think all you engaged in connection with the great tramway undertakings of the country will say was a proper and a sound financial position. We decided that not only should all repairs be paid out of revenue, but we also decided to pay the whole of the renewals out of the current year's revenue. We have carried out that system from the beginning. I think everyone will agree with us it has been and is a sound financial system on which to work every such undertaking. Last year the expenses of repairs and renewals of our tramways system amounted to no less than £49,389, every penny of which was paid out of revenue. (Hear, hear) Then we adopted another system in Sheffield—one of being our own insurers, and that has given us an extra financial advantage, and saved us money, instead of spending large amounts on premiums to different insurance companies. Then we have always adopted the principle of being generous to our men, both as regards their wages and as regards their hours and conditions of labour, and also as regards their holidays. I think it has been an advantage to us to have so acted. I do not think that at any time we have less than 800 or 1,000 men on our books seeking employment under the Tramways Committee of the Corporation. I think that fact shows that the Tramways Committee has been generous and has acted in a fair manner towards its employees. In addition to that we have had two very great advantages. We had the advantage of having Mr. Fell, the present chief officer of the London County Council Tramways, as our first general manager of the Sheffield tramways undertaking, and I may say this—

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the members of the Tramways Committee particularly welcome the presence of Mr. Fell again in Sheffield, and not only his presence, but also that of his good lady, Mrs. Fell. As regards our second great advantage, there is your out-going President. Certain things may occur in future with regard to Mr. Fearnley, and I do not want to say too much in reference to that, but I do say this, that no undertaking in the country has a better general manager than we have. (Loud applause.) I also want to say in Mr. Yerbury and the heads of departments we have excellent men doing good work; and it is only common justice to say we are served by an earnest, hard-working, and thoroughly competent staff of employees in every branch of this department. I want to say that our relationships with our men are most harmonious. We have had occasionally some slight differences with the men, but those differences have happily been settled, and I venture to think that we have only been the better friends after those disputes have arisen. I think I have said enough in connection with our tramways undertaking. I should like to have told you one or two little incidents in connection with that undertaking, but perhaps they may be "chestnuts." Therefore with your leave I will conclude by saying this. The Tramways Committee hope that every delegate who has done us the honour of attending this Conference in this city has had a happy and a pleasant visit, and that it will continue to be a happy and a pleasant visit until they go home again at the end of the week. I should also like to say how specially we welcome the presence of so many ladies who have done us the honour of coming to visit Sheffield on the holding of this Conference. I hope when they all go back again to their homes, refreshed and invigorated by the salubrious climate of Sheffield, that they will return feeling they have enjoyed their visit, and that the people of Sheffield are always ready to welcome anyone who is good enough to come to see them. And I hope, when in the future you hear the expression which is sometimes used by men from Sheffield, you will rather regard it as a term of affection than a term of reproach. I thank the proposer of this toast for his kind words, I again thank you, ladies and gentlemen, on behalf of the Tramways Committee of this city, for the way in which you have responded to the toast, and I desire to convey to you how pleased we have been to see and welcome you on the occasion of your annual Conference. (Applause.)

## VISITS TO WORKS, TRAMWAY STATIONS, ETC.

In the afternoon, many of the delegates and their friends visited various works and other places of interest in Sheffield. The city is, of course, known throughout the tramway world as the home of several firms famous for the manufacture of special trackwork, and these firms kindly threw open their establishments to those attending the Conference. The works visited included those of Messrs.

Edgar Allen and Company,
Hadfield's Steel Foundry Company, and
L. Osborn and Company (The Titan Trackwork Company).

Here the visitors were hospitably received and were shown the methods of manufacture, and inspected work of various kinds in progress. Other places visited included the Neepsend electric supply station, the tramways power-station, Queen's Road car works, the Shoreham Street central car depot, and the Applied Science Department of Sheffield University.

The guests were conveyed by motor omnibuses, chars-a-bancs, and tramway cars, which were placed at their disposal by the tramways department. These motor vehicles were used throughout the Conference, and greatly facilitated inspection of the city and travelling to and from hotels, the town hall, etc. Sheffield Corporation now have 10 Daimler omnibuses, and this number will shortly be increased. As the visitors discovered, the cars run with great smoothness, and they appear to be giving excellent results. The Daimler Company provided a single-deck vehicle elegantly fitted up, and Mr. W. A. Stevens brought down from London a Tilling-Stevens petrol-electric omnibus, which was closely inspected.

## THE ANNUAL DINNER.

The twelfth annual dinner of the Association was held on Thursday, September 25, at the Royal Victoria Hotel, Sheffield. The President of the Association, Mr. A. R Fearnley, occupied the chair, with the Lady Mayoress and the Rt. Hon. the Lord Mayor on his right, and Mrs. Fearnley and Councillor A. J. Hobson, ex-Lord Mayor of Sheffield, on his left. The company was large and representative, including most of those who had attended previous functions in connection with the Conference, and other guests. During the evening musical selections were agreeably rendered by Miss Ida Bloor, Mr. Robert Charlesworth, and Mr. Harry Heath (Sheffield tramways department), with Mr. Arnold Bagshaw as accompanist.

After the toast of "His Majesty the King,"

Alderman C. F. Tetley (chairman of the Leeds Tramways Committee) submitted the toast of "The Lord Mayor and Corporation of the City of Sheffield." He said: I can hardly tell you how much I appreciate the honour of being asked to act as your mouthpiece to-night, and as the representative of one great city in Yorkshire to propose the health of the Lord Mayor and Corporation of another great city in Yorkshire, and to wish continued success and prosperity to every undertaking that has its home in the city of Sheffield. I am very glad to be able to offer to Sheffield every sympathy and goodwill that can be conveyed from one civic body to another, and I am quite sure that the city which has received us to-day and yesterday so hospitably and so beneficently, and the Lord Mayor and Lady Mayoress who entertained us so well this afternoon, with our ladies, deserve at your hands a most hearty vote of thanks. I suppose in all great cities the aims and aspirations of the citizens are very much the same. I suppose they consist chiefly in this, that external commerce should be enlarged, that internal trade should progress greatly, and I have no doubt in the hearts of many here the deepest wish is that there should be a magnificent and scientific development of the great industries that flourish in this city. The main parts of both Sheffield and Leeds lie at the bottom of valleys, and those valleys have rather steep sides, and I suppose the chief aim of the members of the Sheffield Corporation to-day is to take the people of Sheffield up those steep sides away from the bottom of the valley, and convey them out into the beautiful surroundings which exist round about Sheffield as they do about Leeds. And here, when the tramway has done its duty, the difficulty of other members of the Corporations begins, because I am quite certain of this, that in Leeds, and possibly in Sheffield, the chancellor of the exchequer of the local body considers that the tramway affords a great deal too convenient an exit from the city, and that if the facilities of the tramways are much increased, the run-away ratepayer will be largely increased also. In the words of a local newspaper which I saw this afternoon, Sheffield has been to a certain extent a more or less hungry wolf, and has swallowed Tinsley and some other adjacent villages. Leeds, I understand, is a much more hungry wolf, and is going in for a much more extensive scheme. The difficulty that everybody has to contend with who is interested in the finances of the city is, first, whether it is right to prevent the ratepayer being a run-away ratepayer, and secondly, if he is a run-away ratepayer, what is the best means of recapturing him. I may congratulate the more or less hungry wolf of Sheffield, whose appetite has to a certain extent been stayed, from the hungry wolf of Leeds, whose appetite has not had the slightest chance of being stayed as it ought to be. I am sure that the prosperity of Sheffield is bound up in the prosperity of the district, and that all you can do to help yourselves will be sure to help the districts round about. Our products are not quite the same as yours; our products are eminently peaceful. We send clothes abroad, we send cloth abroad, we send shoes abroad. We hope that as our trade abroad prospers, so your trade, even if it is less peaceful than ours, may also be prosperous in the countries where you trade. I consider that much of your warlike exports is as necessary to those countries as wearing clothes, as our more peaceful exports are; for I consider not only is it right for an individual to have an opportunity of doing the best he can for himself, but also independent organisms of the community are compelled to maintain that independence and do their best to maintain and assert their position in the world. I recognise that part of your aims and desires is not only to preserve but to increase the amenities of your city. I am quite certain that very much can be done to improve the amenities of great cities in the north of England. In that connection I hope you as a University city will derive great benefit from the scientific researches of the University and the great manufactures that somehow or other are helped, or ought to be helped, by the University. It has long been the custom to cry up the forms of rule of thumb in dyeing and in tanning, but I hope that, thanks to the researches of the various Universities in England, and the University of Leeds specially, with its leather department and its textile department in particular, as far as those two trades are concerned, that any desire to stick to the rule of thumb will disappear entirely. There is one great problem which assails us all, and that is how to get rid of the terrible pall of smoke that hangs over these cities. We look to the very greatly extended use of gas as a fuel. I would particularly congratulate the metallurgical department of the University of Sheffield upon the researches it has made into fuel and into the composition of metals. I am quite certain of this, that they will lead to great economies, not only of fuel but also of raw material. In the researches into fuel by the sister University of Leeds great advantage is likely to accrue in the use of gas, and I may hope that not only the great gas companies but the great municipalities also will encourage the use of gas for domestic purposes, and that we shall really see before many years have elapsed a very great improvement in the state of the atmosphere above us. Now, I wish success to Sheffield, not only as a trading town, but as a University town also, and I wish to the Lord Mayor of Sheffield and the Lady Mayoress a continuance of health and strength in their arduous duties. I am sure you will all wish to drink with me to the great prosperity of the city of Sheffield and of its

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enlightened governors and of the Lord Mayor and Lady Mayoress. (Loud applause.)

The Right Hon. the LORD MAYOR OF SHEFFIELD, responding, said: I wish in the first place to thank Alderman Tetley for the exceedingly kind words in which he has proposed this toast, both on behalf of the Lady Mayoress and myself, but also and more particularly on behalf of the great municipality, of which I have the honour of being the head for this year. Sheffield and Leeds stand in both a healthy and a desirable rivalry with each other, and I earnestly hope that the neck-and-neck race may continue for many years to come. It spells good to both of us, and if one lags hopelessly behind in the race the other lacks incentive to progress. I think we have certain advantages in this respect, that when we think of enlarging our borders, we have not many opportunities of running up against other municipal authorities. The policy which I think Sheffield has endeavoured to adopt is this, to make the privileges of the citizenship of Sheffield such that others have been glad to come in under our rule in spite of the cost of such privileges. I hope you have been impressed, as you have gone round our works, with the fine physique of our workmen: as you have gone round our streets, with the healthiness—I will not say the speckless cleanliness—of the children of the city, and that you will notice that we are enjoying a vastly improved period of good health as compared with past years. The municipality of Sheffield has taken a very progressive part in all educational matters, and I was particularly pleased that the proposer of this toast made special reference to the technical department of our University. We realise that it is work that has been of great value to the city of Sheffield in supplying good material for tramway purposes, and we believe that it will continue to be of such service. Throughout the work of our City Council, I think we can claim that the same quality of efficiency rules as obtains in our tramway department, and no one can make a stronger statement than that. It is not for me, ladies and gentlemen, to add anything more. Short speeches should be the feature of such a gathering as this. Again I would thank you on behalf of the municipality of Sheffield for the exceedingly kind way in which you have received this toast. (Applause)

Mr. J. M. MCELROY (Manchester) proposed the toast of "Our Guests," saying: At half-past three on Tuesday afternoon I returned to this country, having travelled some 12,000 miles—at the Manchester Corporation's expense—and heard something about tramways and passenger transportation in other cities. One of the first documents I got on my return was a communication from our esteemed secretary, instructing me that I should be called upon to propose this important toast this evening. I have been considering the best way I could tackle this task of mine, and I approached several important members of the Association and asked them to give me their valuable advice, but after a time I found myself a little mixed. Our secretary has given me a list of our guests here this evening, and it is a comprehensive one. We have honoured guests in members of the Sheffield Corporation; we have representatives of the Tramways and Light Railways Association, a sister association with whom we have been pleased to work in connection with tramway matters, and tackle our many problems jointly, to the benefit not only of municipalities but also of companies and the tramway industry generally, viz., Mr. Harry England and Mr. Sayers; we have in Messrs. Chattock and Fedden representatives of the Incorporated Electrical Association, also a sister association; we have representatives from the Corrugation Committee, Mr. Worby Beaumont and Mr. Howley. We have representatives of several important steel manufacturing firms in Sheffield; we have the technical Press, we have our esteemed hon. member, Mr. Blain, our immediate past-president; and last, but not least, we have with us the ladies. I have not been able to think out how best in a comprehensive way to express to all these guests of ours our sense of happiness in having them here with us this evening. Last night, after dinner and supping with the Lord Mayor, I went home to bed and dreamed dreams. I thought all those who represented other associations had written papers. Mr. Harry England seemed to be poring over a paper on something about the Tramways Act—"A peep behind the scenes," or "How can a tramway manager become a City Councillor." (Laughter.) Then there was our old friend, Mr. Worby Beaumont, who seemed to be very assiduously engaged on "How the Tramway Bubble has been burst." I see there are members of firms and their representatives here, and last night they all seemed to be engaged in trying to find out how to prevent manganese becoming sweet by becoming honeycombed. (Laughter.) I think there would be an advantage to this Association if we could have some of those papers read at some of our conferences. But I am sure that I am only expressing the views of every member of our Association when I say how glad we are to see them here at these annual gatherings; it is the only opportunity we have of meeting them, and we hope they will come every year. We hope when we meet in 12 months' time in Salford we may have the pleasure again of seeing everyone here, and I will ask you to join with me heartily in drinking the health of "Our Guests" this evening, and I couple with that toast the name of Councillor A. J. Hobson, J.P., and Mr. Harry England, who will perhaps tell us something of the paper he wrote last night. (Applause and laughter.)

Mr. Councillor A. J. HOBSON, J.P. (Deputy Lord Mayor of Sheffield), who was received with applause, in responding said: The pleasure we derive from riding in the people's motor car is great, and the pleasure you seem to derive from coming to Sheffield to talk about it appears to be equally great. We hope your deliberations in this Conference will be useful to the cause, that greater facilities even than those you give already will result from the pains, the care, and intelligence, and the great labour you give to trying to study how best to develop the municipal tramway systems. (Hear, hear.) Probably the first half of last century was marked most by the development of steam power in industry, which did so much to improve the wealth, not merely of England, which first of all took it up, but the whole industrial communities of the world. Probably during the next 50 years now elapsing the great feature of human invention was speeding up, and the rapidly increasing facilities, not merely of personal travel throughout the world, but by communications throughout the world, by the development of railways, steamship lines, bringing raw material and food from all parts of the world to the industrial communities of Europe. That again did much to lift the world into a situation of greater comfort and greater happiness, and in that later movement the tramways have taken a share, of which they are entitled in every way to be proud. The progress that is being made in Sheffield, from the old horse car to the modern electric car, is equivalent to the progress that has been made from the small and slow sailing ship of the old days to the great leviathans that cross our oceans with extraordinary punctuality, notwithstanding the conditions of wind or weather. But somehow there seems to be an atmosphere of very considerable unrest and discomfort. I do not think it can fairly be said that the people as a whole are worse off than they have ever been. It must be remembered that many things have been supplied in the way of free education, free compensation for accidents, free old-age pensions, and a contributory health insurance, which have to be weighed in the balance in estimating wages. These things have to be paid for, and the way they have to be paid for is largely worked out by an inexorable economic law in the greatly increased cost of living. I should be glad if someone could find some new equivalent to those great movements of the last century that would do something to lift the people of the world again on to a higher plane. After all, it is right that man should be a creature of continuously progressive desire, and the wide spread of education has only made those who are educated long for greater leisure, greater opportunities of culture and more pleasure. I believe that the only way that that will have to be done in a satisfactory way is to improve the efficiency and comfort of the race, physically and as a matter of care, or to place it in greater command of the natural resources of the universe. Nothing has more deeply interested me than reading lately the reports of the meetings of the British Association at Birmingham, for we see there that the great chemists and the great physicists of the world begin to dream dreams, that they are on the verge of a great step forward in the scientific control of the resources of the universe. Radium appears to have revised the whole ideas of the scientific world as to what is possible. We have all believed up to now that you could never get out of anything more than you put into it, and that there was no method of increasing force. But we are now told that if we can unlock the extraordinary electric power that is found in the association of the smallest atoms in their mechanical construction that we should have a source of power so great that—the statement was made in the chemistry department of the British Association—there is enough atomic power locked up in one pound of coal to send the Mauretania or the Lusitania across the Atlantic. As it takes about 12,000,000 lb. of coal burnt in the furnaces to do that now, the extraordinary extension of human resources that would come from obtaining power of that nature is at any rate something that would lift the whole life and prosperity of the world into a new era of comfort. I do not know whether the scientific men who are trying to discover the key to the structure of atoms will realise the promise of their dreams, but at any rate in the universities that have been founded in the great industrial centres of the north of England, and spoken of so enthusiastically by my friend from Leeds, is the greatest hope of such discoverers to improve our position in relation to the universe that I know of at the present time. It is not the least satisfactory comment that I can offer with regard to the tramways department af Sheffield, that in addition to the handsome relief they have brought to the rates of the city, they have so nobly contributed to the building of the University of Sheffield, and only at the last meeting a vote of £10,000 spread over 10 years was passed to the science department of the University, which will go largely to increasing the laboratories of the chemical department, and from those laboratories great things may come when they have reached the fulfilment that I hope they will reach. To turn for a moment to lighter matters, I would suggest to tramway managers from other towns that there are perhaps directions indicated in those statistics they have not yet pursued. An enterprising gentleman communicated a letter to our Sheffield papers a short time back, and said that when he got into a tramcar he looked round at the ladies who were in the car, and he counted them up by putting down in one category those whom he wished to kiss, and in another category

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those whom he would not mind kissing, and a third category those whom he would have to be paid to kiss. (Laughter.) That is a subject of investigation that you might perhaps look into when you get home, because when you publish in your statistics of your cities that there is a large proportion in your own city of ladies in the first category, there would be no occasion to do as Leeds proposes to do, and we do probably, and add other districts to our city, because there would be a natural growth within the city from the attractiveness you would reveal in those statistics. At any rate, perhaps it would be a better subject to examine than the vexed one of women's rights. One little story comes to me in relation to tramcars which may interest you, and that is in reference to a lady of severe and matronly mien, who was sitting in a tramcar when a man got in who frankly ought not to have been admitted by the conductor, because undoubtedly he had been indulging too freely. The gentleman smiled a beery smile as the elderly spinster lady, hugely disgusted, in a minute or two said in her severest tone, "If I was your wife I'd give you poison." The man smiled at her back and said, "If you were, mum, I'd take it." (Laughter and loud applause.)

Mr. H. ENGLAND (Tramways and Light Railways Association): When I was asked to respond to this toast I demurred. Most of you know I am very diffident—(laughter)—so when I demurred my friend the secretary said, "We will put you behind the ex-Lord Mayor of Sheffield, and then you will only have to stand up and say, 'Amen.'" Well, after hearing Councillor Hobson's response to this toast, I think you will entirely agree that the secretary's remarks were quite justified. I cannot sit down to-night without thanking the Municipal Tramways Association for what is almost their embarrassing hospitality. I should like to refer to one thing my friend Mr. McElroy said. I went to bed last night. I wrote a paper; the paper was not a vista of tramways, or tramways *v.* motor 'buses during next year, but I wrote a paper on the Tramways Act, and I got the Tramways Act, the Light Railways Act, provision for motor 'buses, trackless trolley cars, etc., on the brain. I believe Mr. McElroy is a seer. I should be only too glad if I, or some other member of the Conference preferably, would write that paper and read it as soon as possible. The tramway industry wants it, and calls for it. I thank you, ladies and gentlemen, on behalf of the visitors. I wish to thank particularly the President and Secretary of this Association; it is not often we get an opportunity of thanking them. I have been the chairman and vice-chairman of the Tramways and Light Railways Association for the past few years, I know that we have a tremendous amount of work to do each year that people do not recognise. The secretary's work is particulary arduous, and we pass it over and say nothing. We should recognise to-night—I believe Mr. Councillor Barrow, of Birmingham, follows me—what the work has been. The toast list was abbreviated by Mr. Fearnley, who did not want a toast to the Association, which should have appeared, coupled with the name of the President and Secretary, but that will come later, and and I hope you will take any remarks of mine on that subject as coupled with that toast, and that you will receive it right heartily. (Applause.)

Councillor H. BARROW (chairman of the Birmingham Corporation Tramways Committee): Mr. England has already told you the toast I am going to propose to-night. The President ought to have a vote of censure for leaving this toast off the list—it was doubtless due to his very great modesty—but the toast I am proposing includes not only Mr. Fearnley, but Mrs. Fearnley—(applause)—who herself has helped so very largely in the entertainment of the ladies during this Conference. Talking of Councillor Hobson, perhaps we are getting a little bit tired of tramways. It seems to me we are a little bit inclined to ride on one horse. Some of us say there is only one girl in the world for us, and that is tramways. And the question of the girl reminds me of Councillor Hobson's three categories. I have been looking round this room and I should place all the ladies here in Mr. Hobson's first category. (Laughter.) That further reminds me that in the old days I remember we used to have a toast to the ladies at these dinners. I do not know whether Mr. Fearnley is less gallant than most of us, but that toast appears to have been left out on this occasion, but I am sure that we are all delighted to have the ladies with us. In reference to the question of tramways, I am rather in an unfortunate position at Birmingham just at present, because the tramways department there have put a tramway through a residential district, Edgbaston, and the people there are up in arms with regard to this having been done. I have got furious letters from people complaining of the running of these trams past their houses. It is perhaps rather interesting, reverting to the motor 'buses, to note that on this route where motor 'buses were running, we were told that the motor 'buses were carrying everybody who could be carried, and we asked the company to take them off, which they did. We started running our tramcars, we put on twice as many tramcars as there had been 'buses, giving three times the accommodation, reduced the fares from 2½d. to 1½d., and our cars have been crowded ever since, although we have given three times as much accommodation. One other point, Mr. Hobson was talking about improving the conditions in our big cities. I do not want this Association to lose sight of a paper which was read by Mr. Baker some time ago in reference to town planning. We in Birmingham have been endeavouring to carry out some town planning for our various districts. In those plans we have in several cases arranged for wide roads, 80 to 100 ft. in width where possible, and to put the tramways on a separate track with sleepers. We have further passed through the Council and are now intending to apply to Parliament for a length of line where we shall be able to do that at once, if it is passed by Parliament. Now I will return to my toast, that of Mr. Fearnley, Mr. Spencer, and the Association. I am sure those of us who know what the work of the Association is know that it is not all play at these conferences held once a year. During the year a great deal of important work has to be got through. We wish to thank Mr. and Mrs. Fearnley heartily for the way they have arranged the Conference at Sheffield. One does not want to be invidious, but I do not think I have attended any Conference that has been better arranged than the Conference at Sheffield this year. (Hear, hear.) We are extremely indebted to Mr. Fearnley for acting as president on this occasion. In the chair we have found him courteous and firm in his ruling, and he has made an excellent chairman and has also carried out all the arrangements extremely well. Further than that, we know all through the year the Association is hard at work on various tramway matters, and Mr. Spencer, our energetic secretary, is always trying to do something to benefit tramways. I am sure we shall all like to thank them most heartily for the work they have done, and therefore I give you with confidence the toast of Mr. and Mrs. Fearnley and Mr. Spencer, the hon. secretary. (Loud applause.)

The PRESIDENT, who was enthusiasticlly received, replied: I desire at once to thank you for the very hearty way in which you have received this toast, both on behalf of my wife and myself. I am glad to have the opportunity of saying how glad we all are in Sheffield that you have accepted our invitations in such good numbers. Further, it gives me the opportunity of saying what I should have had to say in some other way, and that is to express to the Sheffield Tramways Committee and the Sheffield Corporation our heartfelt thanks for the way in which they have offered hospitality to the delegates and our Association during my year of presidency. I have, too, with deep regret to express to a number of ladies my apologies for the way in which they were detained this evening. I should also like to take this opportunity of expressing to the Lord Mayor and Lady Mayoress our deep thanks, not only for the kind hospitality they have offered to us, but also for the way in which they have given their time and graced our proceedings. This has been very highly appreciated. This annual Conference gives most of us an opportunity for an annual meeting with each other, which except for the Conference we should not enjoy, and even if it was not for the business part of the arrangements, I should say I hope that the Conference will long continue, if only from that point of view. I think we have all tried to do our duty from the business point of view, and I hope you will return home on Friday evening or Saturday, when you leave our city, the better in every way for the 1913 Conference. There is one absent friend from Glasgow, Mr. Dalrymple, who in 1911 gave us such a hearty welcome to that city. We hope he will benefit by his long journey, and that his city will benefit from the information he will pick up at Ottawa, San Francisco, and the other places where there are very important tramway systems, and that next year we shall have the pleasure of again welcoming him at our Conference. As you have heard, we also have with us Mr. Blain, who last year gave us such a royal and hearty welcome to West Ham, I am glad to think he is again able to be with us as our guest. I can only now say that your presence here in such numbers has amply recompensed us for any little effort that we have made. If I may say so, what has been to me the most striking and the most satisfactory feature of the Conference, has been to view from the presidential chair the way the members have stuck to the business portion of the meetings all the time they have been in the city. I am sorry that my chairman, Sir William Clegg, is not here personally to add a word of welcome. I know he will return to Sheffield with a good many ideas as to how Continental tramways are run, and in time, at any rate, somebody will have to boost up. I again thank you for the hearty manner in which you have received this toast, and I trust we shall have continued success for the remaining portion of our time. (Loud applause.)

Mr. C. J. SPENCER (general manager, Bradford Tramways, and hon. secretary and treasurer of the Association), who was also received with acclamation, said: I am rejoiced that we have an opportunity, though somewhat unsought, of thanking you all here for your attendance. This has been a very gratifying Conference. I should like to express on my own behalf my gratitude to the Sheffield Corporation and to the President for the very kindly and great hospitality on this occasion. So far as my efforts are concerned, I can only say the whole credit for these arrangements is due to your President and his committee. As secretary, it has been a very great pleasure indeed to work 12 months with an old friend and an old colleague. I am not surprised that with Mr. Fearnley as your president you have had, perhaps, one of the most profitable and successful years in the Association's history. What I have been able to do has been very little, but I am very glad to think that that little has been appreciated. (Applause.)

This concluded the toast list and the company separated after singing the National Anthem

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**FRIDAY, SEPTEMBER 26.**

## ANNUAL MEETING.

The twelfth annual meeting of the members of the Municipal Tramways Association (Incorporated) was held on Friday, September 26, 1913, at the Royal Victoria Station Hotel, Sheffield. The retiring president, Mr. A. R. Fearnley, took the chair, and was supported by Messrs. A. Baker, J. B. Hamilton, J. M. McElroy, C. J. Spencer, J. Aldworth (past presidents), and by Messrs. W. Clough, P. Fisher, T. B. Goodyer, H. Mozley, Councillors J. H. Rogers and C. F. Spencer, and Aldermen J. Miles and S. Flint, a large attendance of members being present.

The PRESIDENT: The first item is the minutes of the last annual meeting; we usually take these as read. They have been printed in the proceedings, of which every member has had a copy.

The minutes were then taken as read and confirmed.

The PRESIDENT: The next business is the president's remarks. I am glad to see you all looking so well this morning, though some members of the Executive do not feel so well as they look. (Laughter.) The next item is the report of the Executive Council. Copies have been sent to each member of the Association. Will someone move that the report of the Executive Council be received and adopted, and we will then proceed to any discussion, if necessary?

Mr. H. MOZLEY (Burnley): Are we allowed to say anything on the items in the report?

The PRESIDENT: Yes.

Mr. MOZLEY then moved that the report of the Council be received and adopted.

Councillor J. H. RODGERS (Newcastle): I second that motion.

Mr. MOZLEY: Among the items referred to in the report is the width of vehicles used in the public highway. Most of you know there is no limit. On page six of the report there is a reference to the width of vehicles, and this is a matter which troubles us a great deal in Burnley. Under the Motor Car Order Act referred to, there is, in fact, no limit to the width of the load. The width of the vehicle is limited to 7 ft. 4 in. or 7 ft. 6 in., but there is no limit to the width of the load. We have motor cars with loads 10 ft. 6 in. wide, and we have also 9 ft. 6 in. with the overhang of the car, reducing that to 8 ft. 3 in. We have had several accidents in Burnley, and something ought to be done. The Executive Council have considered the matter and have been to the Local Government Board, but nobody seems able to get anything done. I wish to ask you to go into the matter in your own districts and see if something can be done. The town clerk of Burnley is going to take the matter up, but I think we ought to have the assistance of every other tramway undertaker.

The PRESIDENT: We shall be pleased to hear anyone on any item of this annual report. There are a good many matters dealt with, and allusion may be made to any subject referred to. If there are no comments, I must put the motion to the meeting.

The annual report of the Executive Council was then received and adopted.

[The Executive Council's report is given on a later page.]

The PRESIDENT: The treasurer's report and statement is included in the annual report.

On the motion of Mr. W. CLOUGH (Bury), seconded by Mr. T. B. GOODYER (Croydon), the treasurer's report and statement of accounts were received and adopted.

### APPOINTMENT OF OFFICERS.

#### Alderman H. Linsley Elected President.

The PRESIDENT: The first position we have to fill is that of President of our Association. It is an honour usually allowed to the retiring President to be able to nominate his successor, and with your permission I should very much like to submit the name of Mr. Alderman H. Linsley, of Salford. (Applause.) Mr. Alderman Linsley has had a longer experience of our Executive Council work than any other Council member that we have with us. He has been a member of our Council for seven years; further than that, he has been chairman of the Salford Tramways Committee since its inception some 12 years ago; he has assisted us assiduously in the discharge of his duties as a member of the Tramways Association, and he is a gentleman well known, I believe, to have the respect of every member of this Congress. I therefore, without further words, have much pleasure in submitting the name of Mr. Alderman Linsley in nomination for the position of President of the Municipal Tramways Association (Incorporated) for the ensuing twelve months, and I will ask Alderman Miles, of Bolton, kindly to second the motion. (Applause.)

Alderman J. MILES (Bolton): I feel greatly the honour of being allowed to second the nomination of Alderman Linsley. I thoroughly agree with what your President has said with regard to his qualifications. There is another qualification in addition to those mentioned, and that is that he comes from a royal borough, and we know that the members of that Corporation will endeavour as far as in them lies, to do justice to and make our Conference when it is held in Salford, as I presume it will be, a thorough success. I dare say you will all feel that it would be impossible to imitate the example of Sheffield. Well, I know the Salford people will do their best at any rate not to come behind Sheffield, and whether that be so or not, the question that really appertains to us is the capability and qualification of the gentleman who is to occupy this position. With regard to Alderman Linsley, there cannot be anything but high praise as to the interest he takes in his own tramway undertaking; and in tramway undertakings generally, and the capacity he is able to bring to bear on this particular office. He is a gentleman of exceedingly courteous manner, and I know that every member will receive at his hands during his year of office, a kindly welcome, a good handshake, and that they will feel that they have in him a president in whom they can have perfect trust. I have the greatest pleasure in seconding the resolution. (Applause.)

The resolution was then put, and Alderman H. Linsley, of Salford, was unanimously elected President of the Association for the ensuing year.

Alderman LINSLEY: Mr. President, Mr. Alderman Miles, and gentlemen,—It is to me a very great honour for an Association of this size to confer on me the highest position it is in their power to give.

Alderman H. Linsley.

I feel some little diffidence in the matter myself, because I have got such excellent men to follow, and if it had not been for the gentlemen who have occupied the presidential chair in the past promising to give me all the assistance they possibly can, I should not have accepted this position as readily as I have done this morning. But I think with that offer of assistance, and with the assistance of our excellent secretary, Mr. Spencer, upon whom I am going to rely very largely —I shall draw upon him on all occasions—if I have good health I shall be able to get through the year very well. At any rate I will do my best. And with regard to what Alderman Miles has said about Salford entertaining you, I am not going to say we shall go one better than Sheffield, for that would be a difficult thing to do, but I am going to come as near as I possibly can to Sheffield. We have had one short visit from this Association, and what we did on that occasion I think gave satisfaction, and if we do nothing worse than that I think we shall all be satisfied. I thank you very much for the unanimous way in which you have elected me to the chair of this Association. (Applause.)

#### Election of Mr. Peter Fisher as Vice-President.

Mr. H. MOZLEY (Burnley): I rise with very great pleasure to submit to you the name of a very old personal friend for the position of vice-president of this great Association, Mr. Peter Fisher, of Dundee. (Hear, hear.) I have known him as long as any manager in this room,



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and what is more, he has an intimate connection with Burnley and district, for I think he built most of our permanent way before I reached the town, which he used to visit now and again, so I think my earliest recollections of tramway work are connected with Mr. Peter Fisher, of Dundee. We have other bonds of sympathy. He was a company's manager in charge of a steam tramway system; he was ultimately sold up like myself and handed over to the tender mercies of a municipal authority. I do not think that either of us has suffered in consequence of the change. It affords me peculiar pleasure to submit his name to you as the vice-president for the ensuing year. I ought to say that it is a very natural ambition for the manager of a smaller undertaking that he should attain to this great honour, and I amongst others have looked forward to the position of president. I hope some day that some scheme will be devised by the wisdom of our Executive Council—we have plenty of wisdom amongst us, although you may not know it -(laughter)—which will enable the managers and chairmen of committees of the smaller undertakings to become the President of this Association, and to extend the usefulness of this Association by getting the minds and ideas of the men who are working undertakings of less magnitude than those of the great cities we have hitherto visited. I believe the nomination I have to submit to you will not meet with any opposition or competition, and that it will be unanimously and heartily supported. (Applause.)

Mr. J. B. HAMILTON (Leeds): I rise for the formal purpose of seconding the proposition made by Mr. Mozley. To those of us who are on the Executive Council, it has always been a matter of serious

**Mr. Peter Fisher.**

consideration as to who should occupy the chair, because we recognise that in our Association we have a means of utilising and focussing the work we are all engaged in, which must devolve upon and be influenced a great deal by the work of the President. I think that in the President-elect, your President who has just been duly appointed, we have been exceedingly fortunate. In deciding who should follow him we have had some consideration, and that has been completed in the direction of asking Mr. Fisher to take this post and submit his name to you. I merely refer to that side of it, because I hope you will all recognise in Mr. Mozley's proposition there is a good deal of personal sacrifice on his part, and we all appreciate that, I am sure. I may say, however, that Mr. Fisher's name as the possible occupant of the presidential chair in due course has always been before the Council; his long service in the cause of tramways, an original member of the Executive Council of this Association, of which he has been a member so long, fitted him for the work, and had it not been for that inherent diffidence which is characteristic of his country—(laughter)—I am not sure he might not now have been occupying the ornamental position which some of us occupy as being past-presidents. However, I hope, without making Mr. Fisher blush—he can blush I can assure you—by endeavouring to point out all the many qualities which he possesses, that you will support the nomination which has been made. There is only one point I have to caution you upon. Mr. Fisher says the centre of gravity is near Bradford and in visiting, as we may in due course, Dundee, we shall be a long way from the centre of gravity. Looking at the festive manner in which several members of the Association have been conducting themselves in the past few days whilst enjoying the hospitality of Sheffield, I tremble to think of what will occur when we get so far away from the centre of gravity. But I suppose we must let the future take care of itself, and I think we may safely say under Mr. Fisher's presidency that we shall not go very far wrong. I therefore beg to second the nomination.

The motion that Mr. Peter Fisher, of Dundee, be elected vice-president of the Association for the ensuing year was then unanimously agreed to.

Mr. PETER FISHER: I need not tell you that I appreciate very highly the great honour that this Association has conferred upon me this morning, and I do not want to say any more at this moment than just that I will do everything I can to perform the duties that attach to the office in the best way I possibly can. (Applause.)

Councillor G. A. JOHNSTON (chairman, Dundee Corporation Tramways Committee): Perhaps you will allow me as chairman of the Dundee Tramways Committee to congratulate our manager upon the high honour you have conferred upon him this morning. Like yourself, Mr. President, and other members of this Association, I know that his experience and his abilities are very much appreciated here. Not only are they appreciated here, but I am bound to say they are equally appreciated at home. We know Mr. Fisher to be one of the ablest managers in Great Britain, and what he does not know about tramways is not worth knowing I say we all recognise that, and we appreciate indeed the honour conferred on Mr. Fisher, and we appreciate more the honour that has likewise been conferred on Dundee, and have no doubt he will come up to the standard of past vice-presidents and presidents as well. (Applause.)

Councillor W. H. BUIST (deputy-chairman, Dundee Tramways Committee): May I be allowed also to associate myself with the remarks which have fallen from Councillor Johnston. We in Dundee must congratulate the Association upon getting a vice-president from Dundee. Those who know Mr. Fisher and who know his work appreciate that work. I can hardly understand, however, what Mr. Hamilton meant when he spoke of Mr. Fisher's natural diffidence, because everyone knows that Mr. Fisher is one of the most pushful and boastful men you can come across. In our city he is known as Pioneer Peter. I do not know what he will have up his sleeve for the Association if in due course it does him the honour to elect him president of the Association; but if that time comes, and you pay the city of Dundee a visit, I am quite certain of this, that you will find something new has been devised by one of the pioneers of tramway undertakings. (Applause.)

The PRESIDENT: It will be a very appropriate change from "Pioneer Peter" to President Peter. (Hear, hear, and laughter.)

### The Executive Council.

The meeting then proceeded to elect by ballot members to fill the vacancies on the Executive Council. The retiring members were Councillor Rodgers, Council representative, and Messrs. Aldworth, Goodyer and Hamilton, managerial representatives, there being an additional vacancy in the last class by the election of Mr. Fisher as vice-president.

Councillor Rodgers was returned unopposed as the Council representative.

Alderman H. W. LITTLER (West Ham): Should I be in order in moving that the three retiring members be re-elected?

The PRESIDENT: No, they have to be nominated, and voted on by ballot. That is according to the articles of association.

The following nominations were then made: Messrs. G. W. Holford (Salford), J. B. Hamilton (Leeds), J. Aldworth (Nottingham), T. B. Goodyer (Croydon), A. L. C. Fell (London), W. J. McCombe (Hull).

Mr. J. ALDWORTH: May I ask that my nomination be withdrawn? I have been a member of the Executive since the commencement, and I feel that I should be studying the interests of the Association by retiring, so that one of the newer members can come in, and give you the benefit of his experience and ideas.

Mr. HAMILTON: I desire to move the nomination of Mr. Fell, and I would remind you that a year ago when Mr. Fell was appointed a member of the Executive Council he desired to be allowed to withdraw, and let fresh blood come in. I think we should probably be consulting his own feelings if he was allowed to remain out, but some of you may remember we have a programme before this Executive Council and the Association which involves a very large sum—the question of road maintenance and taxation. I do think that is one of the biggest works we as an Association have ever attempted, and I hope we shall be able to carry it to a successful solution. But if it is going to be successful, I think very distinctly we ought to have a member who is a representative of that great body, the London County Council, with us on the Executive. I especially urge Mr. Fell's appointment for that reason, and I hope it will be carried.

Mr. A. BAKER (Birmingham): I should like to have the pleasure of nominating Mr. McCombe, of Hull. He has been a member of the Association for a number of years, and I think we all remember with

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very great pleasure the delightful paper he gave us at the West Ham Conference. A good deal has been said about the smaller towns being represented on the Executive Committee or Council, not that I wish to call anything small in connection with Hull, but I do think the Association would be doing a wise thing to send a representative from Hull to help the members on the Executive Council. I have therefore great pleasure in nominating Mr. McCombe.

This was formally seconded.

The PRESIDENT: I do not know whether you will accept Mr. Aldworth's withdrawal. There is nothing in the articles to say a man's consent is necessary. (Laughter.) Do you really wish to withdraw, Mr. Aldworth?

Mr. ALDWORTH: I think I do, Mr. President.

The PRESIDENT: I wish to consult Mr. Aldworth's wishes. He mentioned this matter twice to me before, but I persuaded him not to retire.

Mr. ALDWORTH: It is only because I feel new blood is wanted on the committee. It is quite personal, and I leave myself entirely in your hands.

The PRESIDENT: Under the circumstances, then, we will allow Mr. Aldworth to withdraw his nomination. We shall probably be able to get him back with us shortly.

A MEMBER: I wish to ask if we could not co-opt Mr. Holford; it would not be the first time a manager has been co-opted.

The PRESIDENT: That is not provided for in the articles of association. We must allow this nomination to stand, and I think, if I may take the liberty of saying so, there is no reason to think that it will not be supported, because it is very desirable that the President should have the assistance of his manager.

Alderman Brodie, J.P. (Blackpool) and Alderman Bowes (Manchester) were appointed by the President as scrutineers of the voting papers.

Later, it was announced that the ballot had resulted in the election of Messrs. Holford, Hamilton, Goodyer, and Fell. The members of the Executive Council for the ensuing year are thus as follows:

EXECUTIVE COUNCIL, 1913-1914.

*President:*

Alderman H. Linsley, Salford.

*Vice-President:*

Peter Fisher, Dundee.

*Past-Presidents:*

J. Dalrymple, Glasgow; C. J. Spencer, Bradford; A. R. Fearnley, Sheffield.

*Council:*

| | | | |
|---|---|---|---|
| A. Baker .. .. | Birmingham. | J. B. Hamilton .. | Leeds. |
| Ald. Sir W. Clegg | Sheffield. | G. W. Holford .. | Salford. |
| W. Clough .. .. | Bury | J. M. McElroy .. | Manchester. |
| A. L. C. Fell .. | London. | Ald. J. Miles .. | Bolton. |
| Ald. S. Flint .. | Leicester. | H. Mozley .. .. | Burnley. |
| T. B. Goodyer .. | Croydon. | Coun. J. H. Rodgers | Newcastle |

Coun. C. F. Spencer Halifax.

*Hon. Solicitors:*

E. R. Pickmere, town clerk, Liverpool.
Sidney F. James, town clerk, Ilkeston.

*Hon. Secretary and Treasurer:*

C. J. Spencer, Bradford.

On the appointment of honorary solicitors,

The PRESIDENT: Owing to the large number of occasions on which we had to consult our honorary solicitor, Mr. Pickmere, the Executive provisionally added the name of Mr. Sidney James, of Ilkeston. This year we should like to recommend the appointment of both those gentlemen as honorary solicitors. They are both useful members, and we make constant demands upon their services, and they always respond in a most generous way.

I beg to move that Mr. E. R. Pickmere, town clerk of Liverpool, and Mr. Sidney F. James, town clerk of Ilkeston, be appointed honorary solicitors for the ensuing 12 months.

The resolution was unanimously adopted.

The PRESIDENT: We have next to elect an honorary auditor. The duties of that office are very important and they have been very adequately performed by our friend Mr. Holford in previous years. I think possibly in view of my expression of opinion that Mr. Holford will receive your support for the Executive Council, I may take it for granted that he has received your support and that you have carried out your promises, and therefore I am going to suggest that our friend Mr. Mozley, be asked to take up the position of hon. auditor.

A MEMBER: Is it in order for a member of Executive to be hon. auditor? (No, no.)

Mr. W. CLOUGH (Bury): It is not desirable.

A MEMBER: I move Mr. C. Furness, of Blackpool.

Mr. FURNESS: I desire that my name should be withdrawn. I think it is desirable to have a man outside the Association.

Mr. J. B. HAMILTON: I think the appointment of auditor might very well stand over until after the election of members of the committee. There are five names and four only can be appointed, and if it is my fate not to be one of the four I should esteem it a very great honour to be appointed auditor. (Laughter.) I recognise the spirit of the remark from the gentleman from Blackpool, but I think a member who has spent the money should be the auditor. As I have been on the committee, on the principle that an old mason makes a good labourer, I think you ought to appoint me as auditor.

Bailie ALSTON (Glasgow): I beg leave to submit a name which I think would meet with the approval of all here, the name of one of the past-presidents, who is now out of office, one who has no office at all just now, and one who is an accountant by profession. I submit the name of Mr. J. Dalrymple, of Glasgow.

The PRESIDENT: I am glad to say that Mr. Dalrymple is still a member of the Executive Council, and we should not like to lose his services upon it.

Mr. W. J. McCombe, manager, Hull Corporation Tramways, was unanimously elected hon. auditor.

The PRESIDENT: The secretary reminds me that I have omitted the election of secretary and treasurer.

Alderman LINSLEY: If I may have the privilege, I should be very pleased to move that our friend Mr. C. J. Spencer be nominated for the position again. As I said a few minutes ago, I rely very much on Mr. Spencer being re-elected so as to be able to give me the very valuable assistance he has given to past presidents, and therefore I move that Mr. C. J. Spencer be elected hon. secretary and treasurer.

Alderman J. MILES (Bolton): May I have the pleasure of seconding that, and of expressing the feelings of every member of the Association, that we could not have a gentleman who would perform the duties in a more satisfactory, a more kindly, and a more genial manner than Mr. Spencer does. Personally I should regret very deeply indeed to see Mr. Spencer out of that position, and I do not think there is a gentleman in the whole Association better capable of performing those duties than Mr. Spencer. I hope we shall show that this morning by a unanimous vote, and one carried with acclamation. (Applause.)

The motion that Mr. C. J. Spencer be re-elected hon. secretary and treasurer was unanimously and heartily agreed to.

Mr. C. J. SPENCER (Bradford), who was received with renewed applause: I shall be very pleased indeed to undertake the duties and responsibilities of this office for another 12 months, if you think my past history is sufficiently good.

Dr. A. W. CHAPMAN (Manchester): I have the pleasure to move on your behalf the following vote of thanks:

> "That the best thanks of the Municipal Tramways Association be given to the Sheffield Corporation, to the Lord Mayor, and the chairman and members of the Tramways Committee for the accommodation provided for the meeting of the Conference, for the generous manner in which the members and delegates have been entertained, and for the hospitality extended to them; also to the president, Mr. Fearnley, and the officers of the Tramways Department of the Corporation for their efforts in making the Conference so enjoyable and so successful."

That resolution is so comprehensive that it really saves me making any speech on the matter, besides time is limited, but I would just like to point out that there are two omissions. The Lady Mayoress, I think, should be included by name, and also on behalf of all our ladies who have accompanied us to this Conference, I would desire to express how much they have appreciated all the efforts that have been made to entertain them, and how thoroughly they have enjoyed themselves.

Alderman H. LINSLEY: I have very great pleasure in seconding this resolution.

The motion was carried with acclamation.

The PRESIDENT: That matter I will convey to my Tramways Committee and Corporation, and thank you very much for the hearty way in which you received it. I would also say we thank the Rotherham and Bradford Corporations for sending over their trackless trolley vehicles, which were quite an education. They were sent over at considerable trouble, and we appreciate their efforts very much. I also want to acknowledge the assistance I have received from Mr. Spencer, Mr. Falkingham, Mr. Watson, and Mr Oates and their assistants, without whom I do not know where we should have been. (Applause.)

Councillor H. HEATHER (Leyton): I wish to propose a vote of thanks to the President and Secretary for the work they have done during the year. I think the members of the Association ought to honour those who do the work for us. Nobody knows but those who have occupied a similar position the amount of work imposed by office, and they do it as a labour of love. (Hear, hear.)

The motion was carried *nem. con.* and was formally acknowledged by the President.

The proceedings then concluded.

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### REPORT OF THE EXECUTIVE COUNCIL.

The following is the report (slightly abbreviated) of the Executive Council which was adopted by the annual meeting of the Association as reported above.

The Executive Council beg to submit the following report on the work for the past year:

NEW MEMBERS.—Since the last Annual Conference the following local authorities have joined the Association: Belfast, Coventry, Walthamstow.

The following gentlemen have been admitted as members of the Association:

J. Barnard, general manager, Corporation Tramways, Bolton.
L. C. F. Bellamy, borough electrical engineer and manager, Corporation Tramways, Ilkeston.
G. F. Craven, general manager and engineer, Corporation Tramways, Reading.
F. J. S. Hosken, general manager, Corporation Tramways, Darwen.
Wm. Murray, tramways manager, Corporation Tramways, Walthamstow.
H. Pilling, general manager and engineer, Corporation Tramways, Accrington.
W. T. Robson, general manager and engineer, Corporation Tramways, South Shields.
H. H. Saunders, general manager, Corporation Tramways, Lowestoft.
Geo. Webster, general manager, Corporation Tramways, Rochdale.

RESIGNATIONS.—The following have resigned their membership during the year:

W. Binns, engineer and manager, Corporation Tramways, Reading.
H. E. Blain, tramways manager, Corporation Tramways, West Ham.
A. A. Day, general manager, Corporation Tramways, Bolton.
J. H. Ellison, traffic superintendent, Corporation Tramways, Darwen.
C. Mittelhausen, general manager, Urban District Council Tramways, Bexley Heath.

The Council regret to have to state that death is responsible for the loss of one member during the year, viz., Mr. J. H. Ellison, traffic superintendent, Corporation Tramways, Darwen.

VACANCIES ON EXECUTIVE COUNCIL.—The Council also regret to report the loss on the Executive Council of the immediate past-president, Mr. H. E. Blain, West Ham, who has taken up a position outside municipal service, and also of Bailie W. F. Russell, who has resigned his position as chairman of the Glasgow Corporation Tramways Committee. Mr. Councillor C. F. Spencer, chairman of the Halifax Corporation Tramways Committee, has been appointed a member of the Council in succession to Bailie W. F. Russell.

TELEGRAPH AND TELEPHONE WIRES CROSSING TRAMWAY TROLLEY WIRES.—The question of guarding telephone wires belonging to the Post Office has become an important matter for the consideration of tramway undertakings, due to the Government having acquired the business of the National Telephone Company, and with a view of some arrangement being arrived at with the Post Office as to the cost of protection of these wires, the Executive Council, along with representatives of the Tramways and Light Railways Association, obtained an interview with the Postmaster-General in October, 1912, and accompanied by Sir Geo. Scott Robertson, M.P., Sir Wm. Byles, M.P., A. H. Gill, Esq., M.P., attended at the General Post Office for this purpose and interviewed the Postmaster-General. The President (Mr. A. R. Fearnley) dealt at length with the position so far as tramway undertakings were concerned. The Postmaster-General took up the position that the settlement made in 1905, whereby he agreed to pay half when he was second comer, could not be departed from. He pointed out that the National Telephone Company were not a statutory body, and were in a different position from the Post Office. The National Telephone Company were in such a position that they had to accept whatever the Corporations required them to do. He, however, agreed "that where the wires are few in number, up to three circuits—six wires they will be insulated, without prejudice to any further action that may be taken with regard to putting wires underground. The actual cost of the cable itself, or rather the difference in the cost of putting the wires into a cable instead of leaving them bare, would be borne by the tramway authority." The Postmaster-General promised to go into the whole matter, and put forward a general scheme for acceptance in due course. On February 13, 1913, the Post Office put forward in writing the following offer:

"General Post Office,
"London,
"*13th Feb., 1913.*

"With reference to the deputation representing the Municipal Tramways Association which waited upon the Postmaster-General on the 25th of October last, I am directed to inform you that the Post Office engineers have given very careful consideration to the possibility of adopting some method of protecting the telegraphs from tramway power circuits, which, while not less effective than guard wires, shall not be open to the objection referred to by the representatives of the Association.

"As the Association is aware, the erection of aerial cable is impracticable in many cases, and it is always more or less unsatisfactory from an engineering point of view, as well as being expensive, while the construction of underground work at the Post Office expense where the telegraphs were in dangerous proximity to trolley power circuits, as was explained to the deputation, could not be fiancially justified. There is, however, now available an insulating material which will admit of the insulation of each wire crossing a power circuit at a comparatively low cost. While in some ways this method of protection may not prove so satisfactory from the Post Office point of view as the provision of guard wires, the Postmaster-General is prepared to adopt it on certain conditions in view of the representation of undertakers that guard wires interfere with the efficient working of their tramway systems. On the new system the cost of insulating a span of one circuit of two wires will be about 11s. 6d., but the Association will readily appreciate the advantage of avoiding continual applications to undertakers for the cost of insulating such circuits added to a crossing. The average number of wires in a bed crossing a tramway route may be taken as 16, and I am to suggest, therefore, that when a tramway undertaker desires to avoid the erection of guard wires, he should pay a first and final charge for each Post Office crossing (*i.e.*, any arrangement of wires under which all wires are terminated on one side at least on the same support) of £4 10s. 0d. when the Post Office is first comer, and £2 5s. 0d. when it is second comer."

"Of course, when the Postmaster-General is first comer a further initial charge would in each case be made to cover the cost of taking down and re-erecting the circuits already in existence.

"The proposal to use insulated wire cannot for the present apply to trunk wires and wires running parallel to power circuits for considerable distances. Such works, however, are only concerned in a very small number of cases, and cannot materially affect the main question.

"The Postmaster-General cannot admit that the obligation of the undertakers to bear the cost of protection is affected by the fact that the Post Office wires may be erected subsequently to the construction of the tramway.

"As was pointed out to the deputation, Parliament in the interests of the public has conferred upon the Postmaster-General a right to erect and maintain telegraphs upon and over public roads which is prior and superior to the right of any undertaker acting under statutory powers.

"This right is recognised by the insertion in all Tramway Acts and Orders of a clause providing that undertakers shall comply with such reasonable requirements as the Postmaster-General may make from time to time for the protection of his telegraphs. At the conference held at the Board of Trade in 1905 the Post Office contention that the cost of providing protection for the telegraphs should be borne by the undertakers even when the Post Office was second comer was admitted to be reasonable, and it was only as an act of grace that the Post Office agreed to bear one half the cost.

"In view of representations from various bodies that the new methods should be introduced as soon as possible the Postmaster-General will be glad to learn at the earliest convenient date that the proposals are regarded as satisfactory."

This offer was considered by the Executive Council in due course, and it was decided to endeavour to obtain a further interview with the Postmaster-General with a view of getting some modification of the terms. Accordingly a small deputation consisting of the President (Mr. A. R. Fearnley), Vice-President (Mr. Ald. H. Linsley), and Mr. Ald. J. Miles, Bolton, along with Mr. Stephen Sellon, Mr. Harry England, Mr. C. H. Dade, and Mr. A. de Turckheim, representing the Tramways and Light Railways Association, waited upon the Postmaster-General on April 15, 1913, but were unable to get him to deviate from his original position as regards the principle. It was then pointed out that in many country districts the number of wires in a crossing would not average 16, but would probably consist of only three or four wires, and the Postmaster-General agreed that the charge for protection should be varied to 5/9 per circuit in second comer cases, and 11/6 in first comer cases, an annual account to be rendered to the various undertakers for the work actually done over their lines. The result of this further interview was eventually reported to the Executive Council, and they decided that the final acceptance, or otherwise, of the offer was a matter for the whole Association, and accordingly an extraordinary general meeting was held in London on June 18, 1913, when the matter was fully discussed by a representative body of members, and after considerable deliberation the following resolution was passed:

"That this extraordinary general meeting of the Municipal Tramways Association held on June 18, 1913, having heard the report of the Executive Council on the negotiations with the Postmaster-General regarding telegraph and telephone wires crossing tramway wires, recommends the municipalities to accept the offer of the Postmaster-General contained in a letter from the Post Office

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dated February 13, 1913, and amended at a conference which a special deputation had with the Postmaster-General on April 15 last, as being the best terms obtainable from the Post Office.

"This meeting at the same time desires to record its keen disappointment that the Postmaster-General has not seen his way to reconsider the principle of this matter, seeing the change which has taken place by the taking over of the National Telephone Company's system by the Post Office, which circumstance has, in the opinion of this meeting, entirely altered the condition of things obtaining at the time of the agreement arrived at in 1905."

This resolution was duly conveyed to the Postmaster-General on his being notified of the acceptance of the offer.

WIDTH OF VEHICLES USING THE PUBLIC HIGHWAY.—On account of the remarkable growth of heavy motor traffic, further negotiations have taken place with the Association of Municipal Corporations and the Local Government Board with a view to the promotion of some legislation to remove the disability in regard to the width of vehicles that use the public highway, but particularly as to the width of their loads.

The Association of Municipal Corporations, who recently had a sub-committee considering the amendment of the Motor Car Acts and Orders, pointed out that they were not prepared to make any recommendations with regard to the width of vehicles, but as regards the width of loads, suggested that a by-law might be made, with the sanction of the Home Office, under Section 23 of the Municipal Corporations Act, 1882, provided, of course, that a good case was made out. The Local Government Board stated that they were not in a position to give any information as to the prospect of legislation respecting the use of vehicles on roads.

LIGHT RAILWAYS BILL—TRACKLESS TROLLEY VEHICLES.—As stated in our last report, the Board of Trade promoted in the 1912 session, a bill entitled "The Light Railways Bill," in which they sought to amend the Light Railway Act, 1896, to include trackless trolley vehicles, and thus enable local authorities to obtain powers through the Light Railway Commissioners to equip routes for this system of traction. At a special emergency meeting of the Association held in London it was decided, in view of the objectionable road maintenance clauses tabled by a Standing Committee, that steps be taken to have the clauses deleted, or amended. All reference to trackless trolley vehicles was eventually deleted from the bill prior to its coming before the House of Lords, and although an attempt was made to have the section reinserted when before the Lords it was defeated.

EXPENSES OF URBAN DISTRICT COUNCIL OFFICIALS ATTENDING CONFERENCES.—The difficulty experienced by a number of representatives of Urban District Councils, by reason of the attitude of the Local Government Board in not allowing the expenses of delegates attending conferences of this Association, has had further consideration, and negotiations have taken place with the Local Government Board with a view of getting the obstacle removed, but the Executive Council are informed that the Board is unable to deviate from its usual course. The Council felt, however, that further steps should be taken, and accordingly entered into communication with Mr. A. J. Lees, secretary of the Urban District Council's Association. Mr. Lees pointed out that various attempts had been made to get the Local Government Board to pass an amendment to the Public Health Act, 1885, but this had not been attended with any success. The Executive Council therefore regret to report that they are unable to obtain the reform desired at present.

STANDARDISATION OF RAILS, TYRES, AXLES, AND SPRINGS.—At the request of the Engineering Standards Committee, the President (Mr. A. R. Fearnley) was nominated and appointed as the representative of this Association on the Sub-Committee on Tramway Tyres, Axles, and Springs. Mr. A. L. C. Fell (London) was appointed representative of the Association to attend a conference which would have under consideration the method to be adopted to determine the electrical conductivity of conductor rails which would be acceptable to both user and manufacturer, and their report on the matter is being prepared. As mentioned in the last report, the Association have increased their representation on the Engineering Standards Sub-Committee on Tramway Rails, which now comprises Mr. J. B. Hamilton, Mr. J. M. McElroy, and the Secretary (Mr. C. J. Spencer). It is hoped that as a result of the increased representation of tramway operators on these bodies some increased benefits may be obtained.

BOARD OF TRADE REGULATIONS—GAS LAMP BRACKETS.—The Executive Council have had under consideration certain draft regulations of the Board of Trade relating to the earthing of guard wires by means of insulating cable, in place of bonding the pole to the rails, and also as to triple insulation being used between the trolley wire and poles carrying gas lamp brackets. The views of a number of operators were obtained and submitted to the Board of Trade, and they eventually decided to leave the regulation as to guard wires as it stands, and simply adopt triple insulation as an alternative in the case of poles carrying gas lamps, in accordance with the recommendation of the Council.

INCOME TAX—ALLOWANCES FOR DEPRECIATION (PERMANENT WAY).—The interpretation of the agreement entered into by this Association, the Institute of Municipal Treasurers and Accountants, and the Board of Inland Revenue in 1909, relative to depreciation allowances for income tax purposes, has been the subject of negotiation by your Council with the Superintending Inspector of Taxes (Board of Inland Revenue) and the Secretary to the Institute of Municipal Treasurers and Accountants. Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, who first took the matter up with regard to his own system, contended that the allowance for ordinary repairs per mile, as well as the allowance for cost of renewal per mile, should be multiplied by the number of miles of tramways in use during the year of assessment. The Board of Inland Revenue, however, claimed that the allowance for repairs should be the actual average expenditure for the three years prior to the quinquennial period, nothwithstanding the fact that many additional miles of track might have been added to the system. The Secretary of the Institute of Municipal Treasurers and Accountants, in correspondence with Mr. J. M. McElroy, concurred with the view of the Superintending Inspector of Taxes. Later, however, the Board of Inland Revenue agreed that some alteration was necessary, and submitted the following clauses in substitution of paragraph 5 of the scheme, which were accepted by the Executive Council:

"The amount to be added in respect of ordinary repairs should be determined by taking the actual average expenditure as shown in the accounts of the undertaking for the last three years, *i.e.*, the three years preceding the initiation of the scheme, or such period less than three years as the undertaking has been in existence. If at the beginning of any year of assessment for which the allowance is being computed, the mileage of the track differs from the average mileage during the three years above mentioned, the allowance under this head should be increased or diminished proportionately."

The following sentence to be added to paragraph 7:

"The whole amount to be allowed for repairs in each year of the quinquennium can be varied only with variations in the mileage of the track, *i.e.*, the amount to be allowed per mile of track is a constant quantity."

RAIL CORRUGATION.—The Rail Corrugation Committee are pursuing their investigations, but are not prepared to submit a further report as yet. The committee decided not to retain the services of a consultant in connection with this matter at present. In accordance with a resolution passed at the managers' meeting at Sunderland, the committee are concentrating their investigations on the question of vibration of both rails and rolling stock. Special attention is also being given to the question of the application of microphotography in the investigation of the physical structure of metals.

MEETING OF MANAGERS' SECTION, SUNDERLAND.—Meetings of the Managers' Section were held in the Council Chamber, Town Hall, Sunderland, on Thursday and Friday, June 5 and 6, 1913, when about 40 members attended. The following papers were submitted:

| | Subject. | Introduced by |
|---|---|---|
| 1. | "Description of Sunderland Corporation Tramways System" .. .. .. | Mr. A. R. Dayson. |
| 2. | "Interim Report of Rail Corrugation Committee" .. .. .. .. | Mr. R. H. Wilkinson. |
| 3. | "Petrol and Trackless Trolley Vehicles" | Mr. C. J. Spencer. |
| 4. | "Standardisation of Specifications for Tramcar Equipments" .. .. .. | Mr. J. W. Hame. |

Useful and interesting discussions took place on these subjects, and the Conference proved very successful. The Sunderland Corporation extended a hearty welcome to the members, and the Council Chamber at the Town Hall was kindly placed at their disposal for their meetings. The Sunderland and South Shields Corporations kindly entertained the members during their stay in the district.

SLOW-MOVING TRAFFIC ON TRAMWAY TRACK.—The Executive Council have had under consideration the question of slow-moving vehicles keeping as near the kerb as possible, in order not to impede fast-moving traffic and interfere with the tramway traffic. Information has been obtained from a number of systems as to the by-laws in operation dealing with this matter, and it is hoped that some general legislation will be framed which will enable local authorities to deal more effectively with owners of road vehicles.

ROAD MAINTENANCE.—The attention of the Executive Council was drawn to a resolution of the County Councils' Association passed at a meeting held on Wednesday, April 23, 1913, suggesting that steps be taken to eliminate from private bills clauses proposing to give such powers for the construction of trackless trolley systems, or the running of motor 'buses within administrative county areas. The matter was considered at an extraordinary general meeting held in London on June 18, 1913, when the following resolution was passed:

"That this extraordinary general meeting of the Municipal Tramways Association held on Wednesday, June 18, 1913, having had their attention drawn to a resolution of the Executive Council of the County Councils' Association passed at a meeting held on Wednesday, April 23, 1913, suggesting that steps be taken to eliminate from private bills clauses proposing to give powers for the construction of trackless trolley systems, or the running of motor omnibuses within administrative county areas, desires to record its disagreement with such resolution, and to point out that such action would have the effect of delaying local legislation for the provision of transit facilities by road vehicles in districts where such facilities are now urgently required, and

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hereby instructs the Executive Council of the Municipal Tramways Association to take such steps as will result in general and more equitable legislation with regard to the whole question of road maintenance, and to act, if and when necessary, with other associations who may be moving in the same direction."

MOTOR OMNIBUS COMPETITION. The question of motor omnibus competition in the metropolitan area has had the consideration of the Executive Council during the year. It was felt, however, that as a Select Committee of the House of Commons was investigating the matter, no action could well be taken at that time. The report of the Select Committee has been issued and is now under consideration by the Executive Council. Resolutions urging the Government to pass such legislation as will place motor omnibus companies on terms of equality with regard to public obligations with the municipal tramway authorities in the metropolitan area have been passed by a large number of the metropolitan authorities.

MR. J. W. COURTENAY (*Deceased*).—The Executive Council regret to report the death of Mr. J. W. Courtenay, who for many years has been closely connected with tramway undertakings. Mr. J. B. Hamilton, of Leeds, attended the funeral on behalf of the Association, and a vote of condolence was passed when the members were in conference at Sunderland and conveyed to Mrs. Courtenay and family.

LONDON AND SOUTH-WESTERN RAILWAY BILL, 1913. The Executive Council have to report that during last session the London and South-Western Railway Company promoted a bill in which they sought power to own and operate road vehicles and to convey persons' luggage, parcels, and goods to and from any of their stations. It was decided that the Council should give every assistance to the town clerk of Croydon, whose Corporation was petitioning against the bill, and endeavour to get the railway company to delete the clauses, or, alternatively, adopt the model clause which the Association has been successful in getting inserted in similar bills. As a result of negotiations between the town clerk of Croydon and the railway company, the provisions were subsequently withdrawn.

RATING OF TRAMWAYS.—The Executive Council note, with regret, that as a result of appeal to the House of Lords (the Lord High Chancellor, Lord Shaw, and Lord Moulton), the decision of the Divisional Court in the case of the Tottenham Urban District Council *v.* the Metropolitan Electric Tramways, Limited, has been upheld. It will be remembered that the Divisional Court formally affirmed the decision of the justices, being of the opinion that they were bound by the Swansea judgment. The company appealed, and when this case was before Lords Justices Farwell and Kennedy and Mr. Justice Warrington it was held that the tramways were "land used as a railway," and fell within the partial exception from rating as such, conferred by section 211 (1) (b) of the Public Health Act, 1875, and accordingly the Swansea judgment of 1892 was reversed. The recent decision, however, of the House of Lords will have the effect of tramway undertakings again being rated on the full net annual value.

L.C.C. (TRAMWAYS AND IMPROVEMENTS) BILL, 1913.—The London County Council, in the last session, promoted a bill under which power was sought by clause 30 for the Council to work, when purchased, certain short lengths of tramway in London which are not covered by its general powers to work tramways. These short lengths include about one mile of the London United Tramway Company's system. The company opposed clause 30, with the result that clause 31, conferring on the London United Tramways Company compulsory running powers over the whole of the lines of the company in London (about 5¾ miles) now being purchased by the Council, was inserted in the above bill by a Select Committee of the House of Commons. It was felt that some effort should be made to endeavour to get the clause conferring compulsory running powers on the London United Tramways Company deleted, and the members of the Association directed their efforts towards this end by approaching their respective members of Parliament, with the result that the clause was removed when the bill was before the House of Commons. The London County Council have expressed their appreciation of the valued assistance of the members, and the Executive Council take this opportunity of expressing their thanks to the town clerks and members of the Association for their assistance in securing this result.

By order of the Executive Council,

A. R. FEARNLEY, *President.*

C. J. SPENCER, *Hon. Secretary and Treasurer.*

## A LADY'S IMPRESSION OF THE CONFERENCE.

No longer shall we hesitate to pass the salt, never again shall we mind walking under the most formidable looking ladder, for the "City of Steel" has dealt the final blow to superstition—an unwelcome legacy of the dark ages. It has proved in a convincing and uncompromising manner that number 13 can no longer inspire the fear, even the secret terror we entertained for it. This last Conference one might have expected to be an unlucky one; instead Sheffield has set tradition at nought and scoffed at the tales of old wives.

Not only in its tramways is Sheffield up-to-date, but the Corporation have clearly demonstrated their belief in the equality of women; not an invitation or function was there to which we were not asked. It would require a Dr. Johnson adequately to describe the hospitality the Conference received. It may have been out of compliment to Mrs. Pankhurst, who leaves an explosive shell in preference to her visiting card, that on more than one occasion we received "bombes" of a type pleasant to the eye and taste. It would be interesting to know, by the way, if any of the tramway managers have nightmares—one could not say dreams—of a time when women might try to oust them from their posts. In the meantime, however, most of us, I expect, are content to leave the managing of tramways alone and seek a more successful sphere, in managing the managers.

The Tramways Conference is an ideal gathering for those of us who are interested in studying characteristics. One does not require to stare pointedly at their subject, but no one could blame us for just taking a cursory glance or two at some interesting face, and with the different peeps we get of people attempt to read their character. This glancing may be conveniently done at meal times, and for this reason it is not wise to choose a chair at breakfast that faces the wall. At present there is no distinctive type of face amongst tramway managers such as would stamp them as such, in the same way that members of the legal profession can be detected. Perhaps this is not to be wondered at when we remember that there have been lawyers since the time of Moses, whilst tramway managers are the outcome of modern ages—only slightly older than the controversial "'bus they have now to tackle."

The question of "where and when" to wear the Conference badges has yet to be solved. Some sport it from the informal reception until the last good-bye has been said. Others wear it in their pockets or bags. This savours of cowardice, but may really be the outcome of a superabundance of modesty. Of course one does not like to pass as a temperance reformer or trade unionist, if one is neither of the two; and this reminds me of a passenger in the train coming back from Welbeck who, after peering suspiciously at the badge, and then at its wearer, said questioningly to him "Out on strike?" "Out on holiday!" was my friend's reply to the short-sighted one.

Space does not permit me to catalogue all the arrangements so hospitably planned for the ladies during the Conference, but mention must be made of the delightful drive to Haddon Hall. The romantic story attached to it greatly added to the charm of the outing, for happily romance is not yet dead—not even tramways nor motor omnibuses can kill it. It may not have been an easy matter for Dorothy Vernon to escape from Haddon Hall—we did not inquire too closely into the truth of the story—but we found it rather a difficult matter to get in at all. The keeper, fearful lest there should be any among the party who had bombs or hammers, insisted on collecting all handbags. In these "hammer and tongs" days one can hardly blame him, but I think if we had been "put on our honour," there would have been no cause for regret. The afternoon at Haddon Hall was all too short. Hours could have been spent at the gorgeous garden at Gridleford, yet minutes had to suffice. It needed but little time to feel the graciousness of our hostess, the Lady Mayoress, and partake of the delightful tea provided for us. We resumed the journey to Sheffield in a Corporation motor omnibus, which glided along like a billiard ball. Some of us who journeyed by motor car were not quite so fortunate as the passengers by omnibus, but "all's well that ends well"; and we reached our hotel in time to prepare hurriedly for the annual dinner. The excursion on the following day to Welbeck, the palatial seat of the Duke of Portland, released the men from their strenuous attendance at the Conference, and they seemed to enjoy the excursion as much as the ladies.

Time warns me that I have exceeded the limit, but before finishing there is one regret I would like to mention, and that is having to say "good-bye" to Sheffield.

L. P.

**The Arbitration Difficulty at Sheffield.**—It will be remembered that the Sheffield tramways employees, although willing to submit to an arbitrator their difference with the Tramways Committee as to time and a half pay for Sunday duty, were unable to agree to the terms of reference drawn up by the town clerk for consideration by Judge Benson. The general manager has now received a letter from the Association of Tramway and Vehicle Workers stating that they would prefer to leave the case in the hands of the Tramways Committee, but they asked the committee to consider an application on behalf of certain employees not already in receipt of time and a half pay for Sunday after five years' service with the department. The general manager has been directed to report on the request.

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## THE LACK OF A TRAMWAY ("CONFERENCE") BELL.

By An Irresponsible Member.

The "bell" is a very conspicuous factor in the economy of public and private life. On all hands we see its usefulness demonstrated, and, as a matter of fact, we should find it very difficult to get along without this humble instrument or without some substitute for the same. One of the most useful and indispensable adjuncts to public comfort and convenience is the tramway conductor's bell. It is a necessary part of the tramway conductor's work; does not "strike" except in the legitimate sense of the term; is, as a general rule, absolutely to be relied upon, and when for some reason or other it goes out of order, we find ourselves at once inconvenienced to an extent out of all proportion to the intrinsic importance of the instrument concerned.

There are other bells, of course. They have varied duties to carry out; and, if one tried to understand the psychology of the case, one would be tempted to endue the differing bells with differing qualities according to the functions which they are called upon to perform. One might, for instance, endow the tramway conductor's bell with the quality of "imperiousness"; the motor bell or horn with the same property as that popularly supposed to be possessed by the "Last Trump"; the church bell with notes of "persuasiveness"; the dinner bell with tingles of "joyful anticipation"; the mistress's bell to the kitchen with the tone of mere "suggestiveness" (at least from the maid's point of view); the telephone bell with the "Come, or I'll make you" attribute, and so on. The list might be extended indefinitely.

One is led to reflections such as these by the fact that the conductor of our Conference entirely lacks such an indispensable adjunct to the dispatch of Conference business. We have capable as well as ornamental figures in the chair who wish to see the proceedings carried on with promptness and dispatch. Then we have an exceedingly valuable and illuminating paper read, containing material for four or five hours' discussion. Then, by arrangement, we have an opener of the discussion who appears to misunderstand his function and regales us with another paper, dotting the "i's" and crossing the "t's," and saying "ditto" to the first paper. When he is not doing this he is bringing in extraneous matter of doubtful interest, followed by wearisome details. Following this another speaker gets up and takes about twenty minutes to inform the audience that he does not agree with the writer or the paper. He does not deign to bring forth any facts or figures to prove his contention, probably having the feeling that to do so would unduly tax the mental capacities of his hearers. By this time the period allotted to the discussion of the important subject has been exhausted, and although member after member gets up in a vain effort to be heard, and interjects cross words to "cross benches," the session has to be brought to an end, there having been no real discussion and of necessity no reply.

Where is that Conference bell? Oh! for a bell which has the quality of "remorselessness" in its clang, and which would have the calculated effect of frightening a speaker into his seat when his allotted time had passed. If I were a president and I had to deal with about 200 men, and only a short space of time in which to allow a subject to be ventilated, my right-hand bell would be my right-hand "man." At the outset I would say "Gentlemen, the opener of the discussion will have ten minutes and no longer, the next four speakers will have five minutes each, and all the following speakers will have three minutes, and ten minutes will be allotted to the reply, and you will all kindly keep to the point. Gentlemen, the fiat has gone forth; the bell is in good order, and I wish you to take notice that it will be put into strenuous operation."

By this means the "dreary drip of dilatory declamation," from which we have all at times suffered, would come to an end, and the "hot-air" merchant would be compelled to restrict his output or to change it at short notice into a volume of "compressed" air.

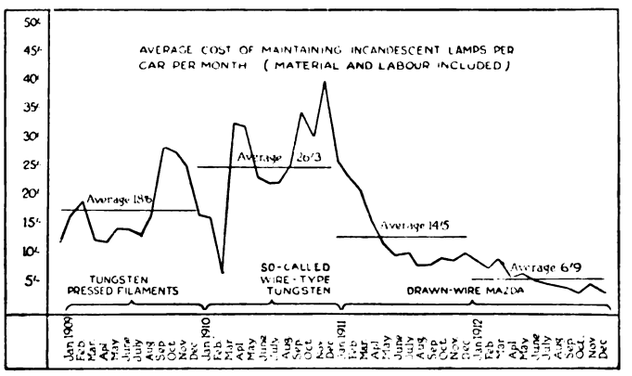
Only in the above way can we economise our time, save our tempers, ventilate a subject, deal out contentment to the listeners, please the person who takes the trouble to write a voluminous paper on a specified subject, and generally give satisfaction all round. May I recommend to the Association, before the next Conference, the purchase of a high-toned instrument calculated to give the utmost satisfaction in the discharge of its duties?

## PREPAYMENT ADVANTAGES AT BRADFORD.

Mr. C. J. Spencer has been interviewed concerning the criticism evoked by the local system of securing payment of top-deck fares before passengers enter the cars. He said that to go "the whole hog" by introducing cars with special platforms would entail in the first place heavy expenditure, and next—in cities which have a complicated system of fares and overlapping stages—the overcoming of a great many technical difficulties. Mr. Spencer added: On being convinced of the success of the Sheffield experiment, both Leeds and Bradford decided to adopt the system, for the purpose of easing the work of the conductor, and to reduce the number of accidents occasioned by people alighting while the cars were in motion, and while the conductor was on the top deck collecting fares. The system came into operation on June 1. Taking the period of 10 months previous to that date, the average number of cases of passengers receiving injuries—mostly of a slight character—while alighting from the cars was 56 per month. Since June 1 up to date the average number of such cases has been reduced to 33 per month—a decrease of 41 per cent. With regard to the suggestion that had been made that the system lent itself more easily to fraud, Mr. Spencer observed that arrangements were made to prevent this, but that, of course, was a managerial matter. The reports from ticket inspectors as to finding passengers without tickets or riding over the stage had very considerably decreased since the scheme came into operation—from which the fair inference to draw was that the scheme was more effective in the prevention of fraud. He had not had a single complaint yet of a passenger being delayed in arriving at his destination as a result of the new method of collecting fares. Even if a car did leave the terminus half a minute or a minute late it would gain the time in shorter stoppages on the journey. Conductors were allowed discretion within reasonable limits as to whether they would allow passengers to go on the top deck without first paying their fare.

## MAZDA LAMPS IN RAILWAY SERVICE.

The most necessary quality which is required in lamps used in railway work is mechanical strength. That this quality is possessed by Mazda drawn-wire lamps is well shown by the instructive diagram reproduced below. This diagram is self-explanatory, and it is interesting because it translates the improved strength of the Mazda lamps into the pounds, shillings, and pence of reduced maintenance costs. The curve was prepared by the Chicago and Rock Island Railway of America, and shows the average maintenance costs per car per month for lamps, renewals, and labour over a period of four years.


AVERAGE COST OF MAINTAINING INCANDESCENT LAMPS PER CAR PER MONTH (MATERIAL AND LABOUR INCLUDED)
50/-
45/-
40/-
35/-
30/-
25/-
20/-
15/-
10/-
5/-
Average 18/6
Average 26/3
Average 14/5
Average 6/9
TUNGSTEN PRESSED FILAMENTS
SO-CALLED WIRE-TYPE TUNGSTEN
DRAWN-WIRE MAZDA
Jan 1909 Feb Mar Apl May June July Aug Sept Oct Nov Dec Jan 1910 Feb Mar Apl May June July Aug Sept Oct Nov Dec Jan 1911 Feb Mar Apl May June July Aug Sept Oct Nov Dec Jan 1912 Feb Mar Apl May June July Aug Sept Oct Nov Dec

**Mazda Lamps in Railway Service.**

In the first year the ordinary "pressed" filament tungsten lamps were used, and the average monthly cost per car was 18s. 6d. In the second year so-called "wire" lamps were used, and the maintenance cost was 26s. 3d. Mazda drawn-wire lamps were employed in the third and fourth years, and the average monthly maintenance cost per car was 14s. 5d. and 6s. 9d. respectively. The lower figure in 1912 was due to the improved strength of the Mazda lamps used in that year. Information in regard to the special types of Mazda lamps which have recently been developed for railway service, can be obtained from the British Thomson-Houston Company, Limited, Mazda House, 77, Upper Thames Street, London, E.C.

**New St. Petersburg Car Depots.**—When the first series of tramways was constructed in St. Petersburg new depots were not built. The old horse car depots were used. It was quite impossible to effect many of the repairs that became necessary, and cars more than slightly damaged had to be sent to the factories. But with the second series of tramways new car sheds are being built, the largest of which is the Rozhdestvenski depot, which occupies a surface of 102,900 square feet. The car sheds will accommodate 200 cars so disposed as to be examined on all sides, with pits between rails for their inspection from below. The buildings are mainly ferro-concrete. Administrative offices three to six stories high are being added. This establishment is expected to be opened in November, when the second series of tramways is to be inaugurated. A second depot, occupying 72,030 square feet, is under construction in Bulfovoi Ulitz for 120 cars.

**More Omibuses for Liverpool.**—Proposals are under consideration by the Tramways Committee for purchasing additional omnibuses in order to extend the services to districts not at present provided with means of locomotion. On October 6 the type of vehicle in use by the Sheffield Tramways Committee was inspected at Liverpool and tested on a route which included the Erskine Street hill. Other types of vehicle are also to be inspected.

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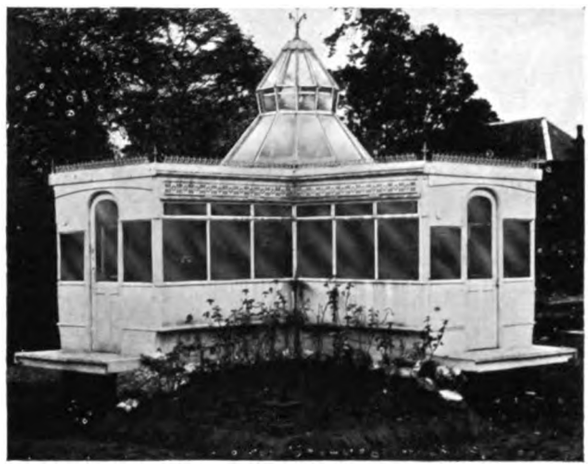
## A NOVEL USE FOR OLD CARS.

The Glasgow Tramways Department are disposing of the old horse cars which, in 1901, were converted into electric cars. These cars are, of course, much smaller than the present standard cars, and are no longer suitable for the traffic. The bodies of the old cars have been sold for different purposes, and a resident of Glasgow, who has a summer home on the banks of Loch Lomond, recently purchased two

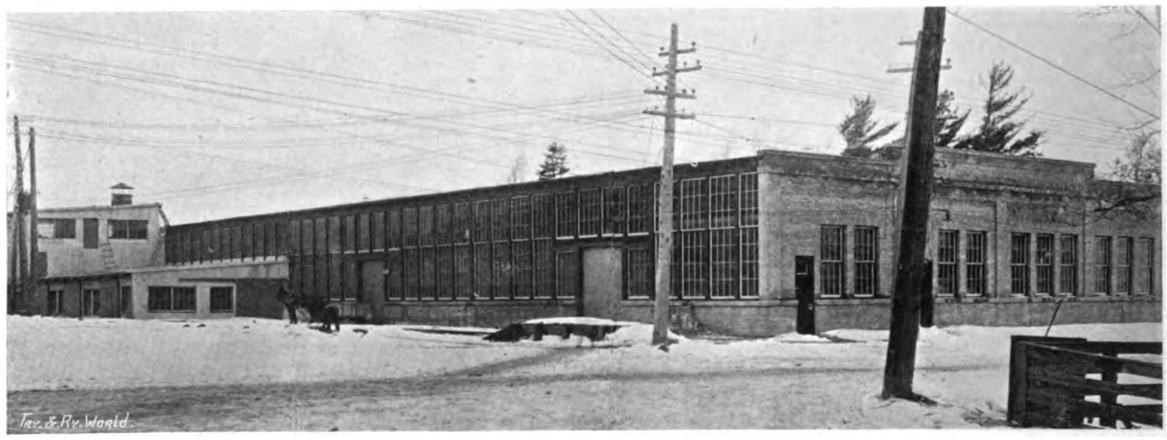


Summer House Made of Old Cars.

car bodies. Each car was cut in two, and from them the summer house shown in the accompanying illustrations has been constructed. By the embellishment of the glass cupola, the architect has constructed a somewhat ornate building, without by any means concealing the origin of the design.

## THE MANUFACTURE OF BRAKE BLOCKS IN CANADA.

The accompanying illustration shows the works which have been erected in Sherbrooke, Canada, by the National Rail and Tramway Appliances Company, of Liverpool. The National Company's steel back block is now largely adopted by the principal tramway and electric railway companies, and the works which have been established in Canada are calculated to spread the knowledge and use of the firm's specialties in that country. The Canadian works, which are capable of turning out 70 tons per day of iron, steel, and brass parts, are managed by Mr. P. McCullough, who was formerly with the company at Liverpool. It is intended to establish works in other important centres, in order to cope with the increased demand for the steel back brake blocks.




National Rail Appliances Company's Works in Canada.

**Birmingham Resisting Overhead Telephone Wires.**—The Birmingham stipendiary magistrate is hearing a series of test cases brought by the Corporation against the claim of the Postmaster-General to erect overhead wires for the development of the suburban telephone service. It is understood that the matter will be carried to appeal if necessary. An offer was made that when the number of overhead wires on a route exceeded 32, the service for 16 subscribers, underground communication would be substituted.

## ILLUMINATION OF STOPPING PLACE SIGNS.

The illustration below shows a pole fitting for illuminating the notices of tramcar stopping places which is supplied by the Equipment and Engineering Company, of 2, Norfolk Street, London, E.C. This fitting has been supplied to some of the largest tramway systems in the United Kingdom, and the special claims put forward for it are that it is simple in construction, effective in use, low in initial cost, and is easily erected on the poles. The apparatus consists of a lamp fitting and high-tension switch box, the switch gear of which is specially insulated for use on from 500 to 550 volt circuits, and it is operated by mechanism outside the box. The lamp fitting and the switch gear are enclosed in a cast-iron water-tight case of massive design. The utility of such an arrangement, especially from the passengers' point of view, is obvious.

A Light for Stopping Place Signs.

**Penalty for Catching Hold of a Tramcar.**—A cyclist has been summoned at Lambeth for catching hold of the side of a tramcar ascending Dog Kennel Hill, East Dulwich. A police-constable informed the magistrate that one section of the Police Act, 1839, provided that any person who caused himself to be carried or drawn by any carriage within the Metropolitan Police district without the consent of the driver was liable to a fine of not more than 5s. The magistrate dismissed the summons on defendant paying costs.

**Tramway Rail Welding.**—Mr. Fearnley's remarks before the Municipal Tramways Association at Sheffield, that the mechanical joint was "fast being superseded," is amply borne out by the list of contracts which Messrs. Thermit, Limited, have on hand at the present time. These include Bradford, Bristol, Burnley, Brighton, Bournemouth, Dublin, Dundee, Huddersfield, Leeds, Liverpool, London County Council (fourth contract), London United Tramways, Manchester, Sheffield, Southampton, etc. No better proof of the popularity and efficiency of the joint could be asked for. We understand that arrangements can be made to see the process in operation at any of these places, by communicating with Messrs. Thermit, Limited, 27, Martin's Lane, Cannon Street, E.C.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Year Ended. | Electric Traction Inaugurated. | System. | Line open (single track). Mls. Chs. | Borrowing Powers. | Borrowing Powers Exercised. | Unexhausted Borrowing Powers. | Total Capital Expenditure. | Capital Expenditure per Mile of Single Track. | Loans Outstanding. | Loans Repaid and Sinking Fund. | Depreciation, Renewal and Reserve Funds. | Gross Receipts. Traffic. | Other. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aberdeen ... | †May 31, 1913 | Dec., 1899 | E. | 27 66 | 350,000 | ... | ... | 350,590 | 12,599 | 192,660 | 157,929 | 143,468 | 79,125 | 1,041 | 80,166 |
| Accrington ... | †Mar. 31, 1913 | Aug., 1907 | ,, | 10 53 | 169,675 | 134,670 | 35,800 | 134,525 | 12,619 | 116,976 | 17,694 | 13,200 | 27,419 | 403 | 27,822 |
| Ashton-u-Lyne.. | †Mar. 25, 1913 | Aug., 1902 | ... | 8 15 | 130,070 | 108,099 | 21,971 | 108,099 | 13,203 | 83,240 | 24,859 | 1,650 | 21,340 | 551 | 21,891 |
| Ayr ... ... | †May 15, 1913 | Sept., 1901 | ,, | 7 49 | ... | ... | ... | 85,445 | 11,224 | 78,933 | 18,044 | 14,918 | 15,626 | 670 | 16,296 |
| Birmingham ... | †Mar. 31, 1913 | Jan., 1904 | ,, | 108 32 | 2,302,001 | 2,089,194 | 212,807 | 1,981,588 | 18,280 | 1,874,109 | 215,084 | 220,369 | 574,248 | 7,318 | 581,566 |
| Blackburn ... | †Mar. 25, 1913 | Mar., 1899 | ,, | 24 63 | 408,174 | 342,474 | 65,700 | 334,924 | 13,512 | 254,600 | 167,381 | 1,000 | 63,440 | 3,243 | 66,683 |
| Blackpool ... | †Mar. 31, 1913 | June, 1899 | ,, | 21 31 | 453,798 | 301,796 | 152,002 | 301,796 | 14,115 | 301,796 | 114,086 | 15,126 | 73,155 | 1,011 | 74,166 |
| Bolton ... ... | †Mar. 31, 1913 | Dec., 1899 | ,, | 47 17 | 552,208 | 551,019 | 1,189 | 559,107 | 11,842 | 338,439 | 162,580 | 55,901 | 135,149 | 1,313 | 136,462 |
| Bradford ... | †Mar. 31, 1913 | July, 1898 | ,, | (h)103 69 | 1,269,568 | 982,398 | 287,170 | 1,002,566 | 9,653 | 607,928 | 388,335 | 89,072 | 280,758 | 18,345 | 299,103 |
| Brighton ... ... | †Mar. 31, 1913 | Nov., 1901 | ,, | 17 15 | 358,620 | 279,000 | 80,715 | 277,914 | 16,170 | 223,556 | 55,653 | 6,708 | 51,780 | 2,018 | 53,798 |
| Burnley ... ... | †Mar. 31, 1913 | Dec.. 1901 | ,, | 22 13 | 388,052 | 339,125 | 48,927 | 231,601 | 10,450 | 179,498 | 56,652 | 48,212 | 79,641 | 249 | 79,890 |
| Burton-on-Trent | †Mar. 31, 1913 | Aug., 1903 | ,, | 9 60 | 108,632 | 104,562 | 4,070 | 106,225 | 10,895 | 50,583 | 53,979 | 8,966 | 14,383 | 1,304 | 15,687 |
| Bury ... ... | †Mar. 31, 1913 | June, 1903 | ,, | 21 14<br>(b) 13 21 | 407,800 | 280,775 | 127,025 | 283,005 | 13,365 | 262,135 | 42,877 | (l)24,571 | 67,370 | 284 | 67,654 |
| Chester ... ... | Mar. 25, 1912 | April, 1903 | ,, | 6 35 | 92,991 | 82,380 | 10,611 | 82,934 | 12,883 | 71,027 | 11,490 | 1,998 | 12,343 | 477 | 12,820 |
| Chesterfield ... | Mar. 31, 1912 | Dec., 1904 | ,, | 5 8 | 95,000 | 70,500 | 24,500 | 69,575 | 13,642 | 60,289 | 10,211 | 5,031 | 11,709 | 496 | 12,205 |
| Colchester ... | †Mar. 31, 1913 | July, 1904 | ,, | 7 75 | 70,748 | 69,555 | 1,193 | 69,401 | 8,743 | 53,425 | 17,049 | Nil. | 10,281 | 477 | 10,758 |
| Croydon ... ... | †Mar. 31, 1913 | June, 1906 | ,, | 19 10 | 287,689 | 287,689 | Nil | 284,847 | 14,894 | 230,968 | 87,264 | 42,453 | 90,543 | 1,921 | 92,464 |
| Darlington ... | †Mar. 31, 1913 | June, 1904 | ,, | 8 71 | 107,500 | 76,263 | 31,237 | 76,322 | 8,587 | 56,888 | 19,434 | 5,726 | 11,842 | 334 | 12,176 |
| Darwen ... ... | †Mar. 31, 1913 | Oct., 1900 | ,, | 7 13 | 93,400 | 86,300 | 7,100 | 86,300 | 12,048 | 57,330 | 28,280 | 7,450 | 14,244 | 1,176 | 15,420 |
| Derby ... ... | †Mar. 31, 1913 | July, 1904 | E.<br>H. | 22 5 | ...<br>... | ...<br>... | ...<br>... | 242,785<br>... | 11,004<br>... | 157,213<br>... | 85,572<br>... | (a)4,486<br>... | E 46,820<br>H 394 | 1,030<br>22 | 47,850<br>416 |
| Doncaster ... | Mar. 31, 1912 | June, 1902 | E. | 11 62 | 103,900 | 94,500 | 9,400 | 95,025 | 8,070 | 82,400 | 13,020 | 27 | 17,417 | 252 | 17,669 |
| Dundee ... ... | †May 15, 1913 | July, 1900 | ,, | 27 38 | (f) | 345,450 | ... | 352,663 | 12,835 | 262,038 | 83,411 | 71,823 | 63,395 | 1,650 | 65,045 |
| East Ham ... | Mar. 31, 1912 | June, 1901 | ,, | 14 32 | 189,524 | 187,073 | 2,451 | ... | 191,260 | | 50,374 | ... | 57,342 | 668 | 58,010 |
| Exeter ... ... | †Mar. 31, 1913 | April, 1905 | ,, | 7 0 | 106,000 | 86,111 | 19,889 | 86,111 | 12,301 | 69,376 | 17,209 | 5,915 | 16,748 | Nil | 16,748 |
| Gloucester ... | Mar. 31, 1912 | April, 1904 | ,, | 15 2 | 191,000 | 144,243 | 46,757 | 147,692 | 9,846 | 113,280 | 14,587 | ... | 15,894 | 1,108 | 17,002 |
| Halifax ... ... | †Mar. 31, 1913 | June, 1898 | ,, | 54 70 | 449,263 | 412,876 | 36,387 | 414,246 | 7,549 | 299,480 | 105,948 | 27,379 | 104,947 | 1,026 | 105,973 |
| Ilford ... ... | Mar. 31, 1912 | Mar., 1903 | ,, | 11 28 | 149,633 | 149,633 | Nil | 149,136 | 13,140 | 114,806 | 34,827 | 7,648 | 27,294 | 2,272 | 29,566 |
| Ilkeston ... ... | Mar. 31, 1912 | May, 1903 | ,, | 4 24 | 64,214 | 47,000 | 15,074 | 47,936 | 11,148 | 42,600 | 11,919 | 350 | 6,533 | 156 | 6,689 |
| Ipswich ... ... | †Mar. 31, 1913 | Nov., 1903 | ,, | 14 70 | 116,471 | 114,300 | 2,171 | 114,838 | 7,720 | 98,858 | 16,305 | 8,180 | 22,575 | 829 | 23,404 |
| Keighley ... ... | Mar. 31, 1912 | Oct., 1904 | ,, | 6 9 | 50,934 | 46,903 | 4,031 | 46,903 | 7,673 | 34,465 | 15,080 | 1,310 | 9,588 | 251 | 9,839 |
| Kilmarnock ... | May 15, 1912 | Dec., 1904 | ,, | 5 47 | 65,000 | 48,246 | 16,754 | 52,666 | 9,426 | 48,205 | 6,090 | 2,749 | 8,400 | 237 | 8,637 |
| Kirkcaldy ... | †May 15, 1913 | Feb., 1903 | ,, | 8 45 | 213,000 | 96,748 | 116,252 | 96,749 | 11,025 | 80,333 | 16,415 | 4,161 | 15,712 | 494 | 16,206 |
| Lancaster ... | †Mar. 31, 1913 | Jan., 1903 | ,, | 4 65 | 60,000 | 51,550 | 8,450 | 43,432 | 9,022 | 36,200 | 13,838 | 3,000 | 5,437 | 143 | 5,580 |
| Leith ... ... | May 15, 1912 | Aug., 1905 | ,, | 17 73 | 275,000 | 235,000 | 40,000 | 235,000 | 13,119 | 193,200 | 42,257 | 302 | 33,851 | 842 | 34,693 |
| Leyton ... ... | Mar. 31, 1912 | Dec., 1906 | ,, | 18 40 | 306,427 | 305,821 | 606 | 295,526 | 15,977 | 256,643 | 40,906 | 3,360 | 61,496 | 1,172 | 62,668 |
| Lincoln ... ... | †Mar. 31, 1913 | Nov., 1905 | S. | 2 77 | 98,519 | 44,947 | 53,572 | 44,992 | 15,187 | 42,893 | 9,862 | (a) 1,600 | 6,717 | 128 | 6,845 |
| Liverpool ... | †Dec. 31, 1912 | Nov., 1898 | E. | 119 0 | ... | ... | ... | 2,015,193 | 16,934 | 1,245,282 | 1,012,873 | 430,509 | 631,071 | 13,103 | 644,174 |
| Lowestoft ... | †Sep. 30, 1912 | July, 1903 | ,, | 4 6 | 94,230 | 87,031 | 7,199 | 87,031 | 21,357 | 67,833 | 13,067 | ... | 10,781 | 17 | 10,798 |
| Maidstone ... | Mar. 31, 1912 | July, 1904 | ,, | 7 3 | 82,932 | 82,582 | 350 | 78,748 | 11,012 | 69,158 | 13,424 | Nil. | 9,279 | 518 | 9,797 |
| Manchester ... | †Mar. 31, 1913 | June, 1901 | ,, | 188 30 | 2,355,689 | 2,034,371 | 321,318 | 2,061,791 | 10,945 | 1,543,504 | 437,305 | 479,683 | 876,023 | 11,624 | 887,647 |
| Nelson ... ... | †Mar. 31, 1913 | Feb.. 1903 | ,, | 3 69 | 38,000 | 37,832 | 168 | 37,832 | 9,795 | 30,118 | 7,714 | ... | 10,240 | 51 | 10,291 |
| Newport (Mon.)... | †Mar. 31, 1913 | April, 1903 | ,, | 14 28 | 219,250 | 196,250 | 23,000 | 193,191 | 13,463 | 164,763 | 31,487 | 9,095 | 37,555 | 995 | 38,550 |
| Nottingham ... | †Mar. 31, 1913 | Jan., 1901 | ,, | 37 40 | 730,300 | 725,945 | 4,355 | 638,005 | 17,479 | 426,818 | 217,041 | 64,242 | 164,746 | 2,404 | 167,160 |
| Oldham ... ... | †Mar. 25, 1913 | May, 1902 | ,, | 28 6<br>(b) 8 31 | 516,925 | 440,204 | 76,719 | 442,174 | 15,750 | 320,725 | 118,217 | 2,135 | 108,003 | 2,574 | 110,577 |
| Perth ... ... | May 15, 1912 | Nov., 1905 | ,, | 6 40 | 90,000 | 77,650 | 12,350 | 77,829 | 11,539 | 64,790 | 13,678 | 1,034 | 9,689 | 412 | 10,101(e) |
| Plymouth ... | Mar. 31, 1912 | Sept., 1899 | ,, | 15 0 | ... | 188,752 | ... | 157,322 | ... | 92,636 | 97,320 | 10,848 | 37,083 | 830 | 37,913 |
| Pontypridd ... | Mar. 31, 1912 | Mar., 1905 | ,, | 8 48 | 136,019 | 135,885 | 134 | 136,896 | 15,919 | 112,862 | 22,899 | ... | 21,130 | 2,036 | 23,166 |
| Rawtenstall ... | Mar. 31, 1912 | May, 1909 | ,, | 15 71 | 196,159 | 182,933 | 13,226 | 181,096 | 11,401 | 169,971 | 12,962 | 2,150 | 24,063 | 1,018 | 25,081 |
| Rochdale ... ... | Mar. 31, 1912 | May, 1902 | ,, | (i) 40 2 | 356,991 | 347,782 | 9,209 | 351,831 | 15,347 | 347,782 | 71,729 | ... | 72,649 | 353 | 73,002 |
| Rotherham ... | Mar. 31, 1912 | Jan., 1903 | ,, | 12 0 | 228,550 | 155,000 | 73,550 | 154,589 | 12,882 | 132,835 | 46,413 | 18,123 | 35,724 | 133 | 35,857 |
| Salford ... ... | †Mar. 31, 1913 | Oct., 1901 | ,, | 75 64 | 1,050,666 | 723,669 | 326,997 | 723,672 | 9,599 | 536,791 | 258,977 | 45,699 | 260,365 | 486 | 260,851 |
| Southampton ... | Mar. 31, 1912 | Jan.. 1900 | ,, | 17 62 | 277,259 | 239,715 | 37,544 | 247,977 | 13,951 | 169,010 | 70,726 | 18,497 | 63,849 | 2,260 | 66,109 |
| Southend-on-Sea | †Mar. 31, 1913 | July, 1901 | ,, | 11 49 | 130,000 | 129,961 | 39 | 143,808 | 12,384 | 116,940 | 12,784 | 3,045 | 34,453 | 465 | 34,918 |
| Southport ... | Mar. 31, 1912 | July, 1900 | ,, | (d) 10 63 | 292,000 | 196,500 | 95,500 | 118,708 | 11,004 | ... | ... | 417 | 18,642 | 402 | 19,044 |
| South Shields ... | †Mar. 31, 1913 | Mar., 1906 | ,, | 10 21 | 251,883 | 174,936 | 76,947 | 172,476 | 16,806 | 150,228 | 30,818 | 20,838 | 33,654 | 498 | 34,152 |
| Stalybridge, H., M., D. | †Mar 31 1913 | May, 1904 | ,, | 27 57 | 325,270 | 274,990 | 44,280 | 279,778 | 10,096 | 224,700 | 56,290 | 500 | 34,961 | 677 | 35,638 |
| Stockport ... | Mar. 31, 1912 | Aug., 1902 | ,, | 27 50 | 305,028 | 234,500 | 70,528 | 238,199 | 8,623 | 176,002 | 58,498 | 54,219 | 59,594 | 1,245 | 60,839 |
| Sunderland ... | †Mar. 31, 1913 | Aug., 1900 | ,, | 20 28 | 308,699 | 303,211 | 5,488 | 305,234 | 14,999 | 182,318 | 111,943 | 31,883 | 68,507 | 364 | 68,871 |
| Wallasey ... | †Mar. 31, 1913 | Mar., 1902 | ,, | 19 69 | 198,167 | 195,290 | 2,877 | 215,424 | 10,846 | 167,924 | 58,733 | 11,927 | 57,458 | 564 | 58,022 |
| Walsall ... ... | †Dec. 31, 1912 | Dec., 1902 | ,, | 19 44 | 188,145 | 188,100 | 45 | 183,351 | 9,378 | 156,161 | 31,939 | 30,879 | 30,629 | 800 | 31,429 |
| Walthamstow ... | Mar. 31, 1912 | June, 1905 | ,, | 12 42 | 180,000 | 180,000 | Nil | 173,081 | 13,846 | 163,679 | 16,321 | 2,757 | 38,249 | 741 | 38,990 |
| Warrington ... | †Mar. 31, 1913 | April, 1902 | ,, | 9 52 | 103,674 | 102,896 | 778 | 102,128 | 10,583 | 73,830 | 29,068 | 10,000 | 22,903 | 302 | 23,205 |
| West Ham ... | †Mar. 31, 1913 | Feb., 1904 | ,, | 30 4 | 563,478 | 551,463 | 12,015 | 556,878 | 18,532 | 539,650 | 90,402 | 40,352 | 137,766 | 676 | 138,442 |
| Wigan ... ... | †Mar. 31, 1913 | April, 1901 | ,, | (k) 34 42 | ... | ... | ... | ... | ... | ... | ... | ... | 71,268 | 1,515 | 72,783 |
| Wolverhampton | †Mar. 31, 1913 | April, 1902 | S. | 21 40 | 279,733 | 265,616 | 14,117 | 278,615 | 12,959 | 217,882 | 47,734 | 50,220 | 53,963 | 797 | 54,760 |
| Yarmouth (Gt.)... | †Mar. 31, 1913 | June, 1902 | E. | 14 32 | 144,500 | 119,750 | 24,750 | 121,899 | 8,465 | 111,450 | 22,737 | 6,070 | 23,625 | 508 | 24,133 |

## TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | †Mar. 31, 1913 | Nov., 1905 | E. | 98 54 | 1,567,674 | 1,386,232 | 181,442 | 1,389,713 | 14,037 | 1,381,200 | 144,342 | 117,769 | 250,589 | 3,788 | 254,377 |
| Bexley ... ... | Mar. 31, 1912 | Oct., 1903 | ,, | 6 42 | 99,942 | 96,984 | 2,958 | 96,924 | 14,854 | 78,800 | 18,184 | (j) 1,074 | 13,826 | 1,542 | 15,368 |
| Birkenhead ... | †Mar. 31, 1913 | Feb., 1901 | ,, | 24 7 | 375,848 | 364,854 | 10,994 | 366,610 | 15,220 | 247,012 | 117,863 | 18,070 | 61,202 | 4,365 | 65,567 |
| Bournemouth ... | †Mar. 31, 1913 | July, 1902 | ,, | (e) 29 62 | 449,027 | ... | ... | 435,788 | 19,500 | 221,797 | 134,815 | 13,733 | 95,695 | 317 | 96,012 |
| Cardiff ... ... | Mar. 31, 1912 | May. 1902 | ,, | 31 66 | 813,923 | 787,292 | 26,631 | 783,051 | 24,683 | 583,869 | 203,422 | 86,411 | 125,743 | 19,181 | 144,924 |
| Coventry ... | Mar. 31, 1913 | Jan.. 1912 | ,, | 15 40 | 220,538 | 216,436 | 4,102 | 211,298 | 13,632 | 216,436 | 3,287 | 2,876 | 38,996 | 157 | 39,153 |
| Glasgow ... ... | †May 31, 1913 | Oct., 1898 | ,, | 193 47<br>(b) 2 52 | 3,714,266 | 3,553,584 | 160,682 | 3,694,143 | 18,595 | 2,479,408 | 1,074,177 | 2,079,645 | 1,007,653 | 3,891 | 1,011,544 |
| Huddersfield ... | †Mar. 31, 1913 | Feb., 1901 | ,, | 46 0 | 646,284 | 407,142 | 239,142 | 417,408 | 9,074 | 255,177 | 161,349 | 19,132 | 106,586 | 3,123 | 109,709 |
| Hull ... ... | †Mar. 31, 1913 | July, 1899 | ,, | 30 44 | 677,673 | 541,871 | 135,802 | 542,371 | 17,753 | 527,641 | 147,925 | 125,407 | 157,048 | 1,393 | 158,441 |
| Leeds ... ... | † Mar. 31, 1913 | Aug., 1897 | ,, | 112 62 | 1,603,455 | 1,546,422 | 57,033 | 1,511,588 | 13,406 | 1,220,041 | 482,698 | 4,637 | 407,552 | 3,979 | 411,531 |
| Leicester... ... | Dec. 31, 1912 | May, 1904 | ,, | 37 0 | 739,240 | 719,223 | 20,017 | 722,021 | 19,514 | 607,476 | 129,211 | 100,000 | 134,966 | 12,705 | 147,671 |
| London ... ... | Mar. 31, 1912 | ... | H. | 23 30 | (c) | (c) | (c) | ... | ... | ... | ... | ... | 60,357 | 1,335 | 61,692 |
| | | May, 1903 | C.E | 255 60 | | | | 11,850,127 | ... | 11,309,789 | 2,423,040 | 920,402 | 2,231,902 | 62,587 | 2,294,489 |
| N'castle-on-Tyne | †Mar. 31, 1913 | Dec., 1901 | E. | 61 0 | 1,522,010 | 1,251,047 | 270,963 | 1,234,080 | 20,230 | 939,120 | 383,921 | 119,407 | 228,091 | 10,114 | 238,205 |
| Northampton ... | †Mar. 31, 1913 | July, 1904 | ,, | 9 13 | 239,800 | 127,255 | 112,545 | 135,481 | 14,786 | 91,176 | 36,078 | 10,499 | 27,250 | 899 | 28,149 |
| Portsmouth ... | †Mar. 31, 1913 | Sep., 1901 | ,, | 30 66 | 662,280 | 698,319 | ... | 712,792 | 23,118 | 647,489 | 234,258 | 94,934 | 108,087 | 1,745 | 109,832 |
| Preston ... ... | †Mar. 31, 1913 | June, 1904 | ,, | 17 16 | 224,102 | 187,270 | 36,832 | 187,269 | 10,888 | 119,790 | 42,091 | 36,841 | 42,964 | 306 | 43,270 |
| Reading ... ... | †Mar. 31, 1913 | July, 1903 | ,, | 13 14 | 235,000 | 234,000 | 1,000 | 229,372 | 17,409 | 169,642 | 59,896 | 17,831 | 32,984 | 1,030 | 34,014 |
| Sheffield ... ... | †Mar. 25, 1913 | Sep., 1899 | ,, | 77 67 | 1,727,596 | 1,413,980 | 313,616 | 1,411,959 | 18,140 | 1,067,897 | 418,292 | 27,521 | 358,656 | 3,189 | 361,845 |
| Wellington, N.Z. | †Mar. 31, 1913 | ... | ,, | 30 7 | 496,423 | 496,423 | Nil | 606,771 | 20,165 | 496,423 | 39,486 | 109,066 | 149,446 | 826 | 150,272 |

C = Electric conduit system. E = Electric trolley system. H = Horse lines. S = Surface contact system. (a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed (d) Car depot extensions. (e) Includes 7 mi. 34·53 chs. single track lines leased. (f) Unlimited. (h) Includes 1½ miles railless trolley route. (i) 17 mi. 8 chn. single track leased. (j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance.
† Reports inserted for the financial year 1912-13.



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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

### Specially Compiled for "The Tramway and Railway World."

## TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Working Expenses. | | | | | Gross Profit on Working. | Additions to Gross Profit. | Deductions from Gross Profit. | | | | | Net Surplus + or Deficit − |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traffic. | General. | Repairs & Maintenance. | Power. | Total. | | | Interest. | Sinking Fund. | Income Tax. | Depreciation & Renewal. | Sundries. | Total. | |
| Aberdeen | 20,710 | 9,404 | 5,954 | 7,138 | 43,206 | 36,960 | 472 | 6,839 | 4,661 | ... | 13,407 | ... | 24,907 | + 12,525 |
| Accrington | 6,839 | 1,870 | 2,102 | 4,644 | 15,455 | 12,367 | ... | 4,000 | 3,693 | 127 | ... | ... | 7,820 | + 4,553 |
| Ashton-und'r-Lyne | 4,699 | 1,964 | 2,358 | 3,225 | 11,997 | 9,894 | ... | 2,814 | 3,536 | 440 | 750 | †1,004 | 8,544 | + 1,350 |
| Ayr | 3,486 | 1,964 | 1,604 | 1,989 | 9,043 | 7,253 | ... | 1,972 | 1,943 | 122 | 2,041 | ... | 6,078 | + 1,175 |
| Birmingham | 160,277 | 40,898 | 68,278 | 100,726 | 370,179 | 211,387 | 11,479 | 65,672 | 49,946 | ... | ... | 5,896 | 121,514 | +101,352 |
| Blackburn | 14,863 | 4,262 | 12,392 | 10,999 | 42,516 | 24,167 | 110 | 5,292 | 14,909 | 206 | ... | ... | 20,407 | + 3,870 |
| Blackpool | 15,992 | 5,132 | 9,286 | 9,272 | 39,682 | 34,484 | ... | (h)9,184 | 6,969 | ... | 8,000 | ... | 24,153 | + 10,331 |
| Bolton | 29,821 | 8,646 | 15,984 | 19,767 | 74,213 | 62,244 | 1,114 | (h)11,189 | 17,197 | 1,095 | 18,715 | 219 | 48,415 | + 14,943 |
| Bradford | 83,763 | 24,458 | 46,061 | 46,271 | 200,553 | 98,550 | 4,045 | 20,735 | 31,926 | 3,653 | 32,921 | 4,360 | 93,595 | + 9,000 |
| Brighton | 14,309 | 4,028 | 12,853 | 8,316 | 39,506 | 14,292 | 27 | 7,800 | 5,560 | ... | 27 | ... | 13,360 | + 932 |
| Burnley | 18,718 | 5,306 | 9,525 | 15,881 | 49,430 | 30,460 | ... | 5,662 | 6,491 | 893 | ... | (f)2,873 | 15,919 | + 14,541 |
| Burton-on-Trent | 5,111 | 1,322 | 2,903 | 2,998 | 12,334 | 3,353 | ... | 1,406 | 1,418 | ... | 1,500 | ... | 4,324 | − 971 |
| Bury | 14,761 | 4,349 | 6,633 | 8,026 | 33,769 | 33,885 | 337 | (h)7,974 | 4,824 | 244 | ... | (w)11,608 | 24,650 | + 9,572 |
| Chester | 3,278 | 1,598 | 828 | 2,248 | 7,952 | 4,868 | 95 | (h)2,773 | 1,018 | ... | 1,172 | ... | 4,963 | ... |
| Chesterfield | 2,712 | 1,166 | 1,469 | 2,019 | 7,366 | 4,839 | 219 | 2,426 | 1,799 | ... | ... | ... | 4,225 | + 833 |
| Colchester | 2,825 | 1,189 | 1,771 | 2,508 | 8,293 | 2,465 | 48 | (h) 2,159 | 2,319 | ... | ... | ... | 4,478 | − 1,965 |
| Croydon | 29,571 | 6,806 | 13,300 | 16,541 | 66,218 | 26,246 | 907 | 7,994 | 7,428 | 1,145 | ... | ... | 16,567 | + 10,586 |
| Darlington | 4,192 | 754 | 1,912 | 1,945 | 8,811 | 3,365 | 102 | 2,010 | 1,966 | 105 | 404 | 59 | 4,544 | − 1,077 |
| Darwen | 3,594 | 831 | 3,096 | 2,395 | 9,916 | 5,504 | 141 | 2,298 | 2,191 | ... | 1,050 | ... | 5,539 | + 106 |
| Derby | E 16,388 H 631 | 2,621 ... | 4,768 73 | 8,200 ... | 31,977 704 | 15,873 def. 288 | 547 | 6,388 | 3,363 | ... | 310 | (l) 300 | 10,361 | + 6,059 |
| Doncaster | 4,071 | 940 | 4,325 | 3,918 | 13,254 | 4,415 | 186 | 2,744 | 1,309 | ... | 107 | 441 | 4,601 | ... |
| Dundee | 16,477 | 5,607 | 7,122 | 10,216 | 39,422 | 25,623 | ... | 8,606 | 6,020 | 233 | 9,254 | ... | 24,113 | + 1,510 |
| East Ham | 16,218 | 6,024 | 10,014 | 9,415 | 41,671 | 16,339 | ... | (h) 5,846 | 6,555 | ... | 517 | 85 | 13,003 | + 3,336 |
| Exeter | 4,511 | 1,175 | 1,311 | 3,499 | 10,496 | 6,252 | ... | (h) 2,347 | 1,814 | 48 | ... | ... | 4,209 | + 2,043 |
| Gloucester | 6,346 | 1,593 | 2,358 | 1,991 | 12,288 | 4,714 | ... | 4,813 | 2,218 | ... | ... | ... | 7,031 | − 2,317 |
| Halifax | 27,116 | 8,306 | 15,263 | 18,976 | 69,661 | 36,312 | 51 | 10,159 | 10,562 | ... | 6,701 | 1,760 | 29,182 | + 7,181 |
| Ilford | 8,930 | 2,010 | 4,838 | 4,664 | 20,442 | 9,124 | 557 | 4,315 | 4,725 | ... | 641 | ... | 9,681 | ... |
| Ilkeston | 2,359 | 579 | 1,613 | 1,476 | 6,027 | 662 | 157 | 1,578 | 1,644 | ... | ... | 210 | 3,432 | − 2,613 |
| Ipswich | 8,072 | 1,827 | 4,015 | 3,502 | 17,416 | 5,988 | ... | (h) 3,642 | 2,078 | ... | ... | ... | 5,720 | + 268 |
| Keighley | 2,769 | 724 | 940 | 1,551 | 5,984 | 3,855 | 224 | 1,160 | 1,815 | ... | ... | (n) 1,104 | 4,079 | ... |
| Kilmarnock | 3,271 | 774 | 988 | 1,754 | 6,787 | 1,850 | 7 | (h) 1,637 | 1,238 | 2 | 1,160 | ... | 4,037 | − 2,180 |
| Kirkcaldy | 4,728 | 1,158 | 1,525 | 2,636 | 10,047 | 6,159 | ... | 2,660 | 1,608 | ... | 410 | 110 | 4,788 | + 1,370 |
| Lancaster | 2,237 | 474 | 872 | 1,621 | 5,204 | 376 | 80 | 1,243 | 1,467 | ... | ... | ... | 2,710 | − 2,254 |
| Leith | 9,057 | 2,439 | 3,588 | 3,147 | 18,231 | 16,462 | 86 | (h) 6,566 | 7,750 | ... | ... | 139 | 14,455 | + 2,093 |
| Leyton | (p)16,573 | 5,056 | 8,211 | 11,672 | 41,512 | 21,156 | ... | 10,340 | 7,596 | ... | 1,478 | 264 | 19,678 | + 1,478 |
| Lincoln | 1,478 | 625 | 989 | 925 | 4,017 | 2,828 | 153 | 1,529 | 1,071 | ... | ... | ... | 2,600 | + 381 |
| Liverpool | 167,045 | 58,771 | 80,184 | 113,893 | 419,893 | 224,281 | 24,045 | 50,096 | 59,155 | ... | (d) 66,929 | (e) 5,217 | 181,397 | + 66,929 |
| Lowestoft | 3,285 | 796 | 2,115 | 2,813 | 9,009 | 1,789 | .. | (h) 2,261 | 1,562 | ... | ... | 350 | 4,173 | − 2,384 |
| Maidstone | 2,324 | 1,077 | 1,139 | 1,868 | 6,408 | 3,389 | 58 | (h) 2,797 | 2,185 | ... | ... | 74 | 5,056 | − 1,609 |
| Manchester | 255,604 | 83,574 | 84,879 | 133,681 | 557,738 | 329,909 | 14,282 | 55,771 | 52,394 | 8,613 | 96,351 | (e)31,062 | 244,191 | +100,000 |
| Nelson | 2,425 | 677 | 1,320 | 2,006 | 6,428 | 3,863 | ... | 1,008 | 966 | ... | ... | ... | 1,974 | + 1,899 |
| Newport (Mon.) | 10,254 | 4,009 | 10,364 | 7,044 | 31,671 | 6,879 | 808 | 5,817 | 4,197 | ... | ... | ... | 10,014 | − 2,327 |
| Nottingham | 43,601 | 15,142 | 18,684 | 30,847 | 108,274 | 58,886 | ... | 14,349 | 19,762 | ... | ... | ... | 34,111 | + 24,775 |
| Oldham | 25,759 | 7,792 | 18,416 | 21,470 | 73,437 | 37,140 | 1,474 | 15,736 | 11,822 | 1,099 | ... | (g) 7,762 | 36,479 | + 2,135 |
| Perth | 3,795 | 680 | 450 | 1,347 | 6,272 | 3,829 | 45 | 2,332 | 2,006 | 2 | 640 | 51 | 5,031 | − 1,157 |
| Plymouth | 7,933 | 3,542 | 5,029 | 7,577 | 24,081 | 13,832 | 1,258 | 4,778 | 3,931 | ... | 3,354 | ... | 12,063 | + 3,027 |
| Pontypridd | 5,307 | 1,469 | 6,611 | 3,656 | 17,043 | 6,123 | 5 | (h)4,293 | 4,034 | ... | 590 | 41 | 8,958 | − 2,830 |
| Rawtenstall | 5,292 | 2,216 | 2,049 | 3,958 | 13,515 | 11,566 | (q)1,663 | 6,148 | 5,531 | ... | ... | ... | 11,679 | + 1,550 |
| Rochdale | 16,421 | 4,475 | 6,944 | 9,527 | 37,367 | 35,635 | 246 | 11,380 | 9,594 | 694 | ... | (z)7,727 | 29,395 | + 6,486 |
| Rotherham | 8,991 | 2,539 | 5,187 | 8,497 | 25,214 | 10,643 | 944 | 4,393 | 2,737 | ... | 3,707 | ... | 10,837 | + 750 |
| Salford | 73,745 | 17,785 | 22,183 | 47,371 | 161,084 | 99,767 | 5,659 | 18,749 | 21,887 | 2,522 | 12,867 | (k)27,401 | 83,426 | + 22,000 |
| Southampton | 17,703 | 4,879 | 8,782 | 12,454 | 43,818 | 22,291 | 6,099 | 6,779 | 6,578 | 574 | ... | 488 | 14,419 | + 13,971 |
| Southend-on-Sea | 8,046 | 2,260 | 3,534 | 6,187 | 20,027 | 14,891 | 4,228 | (h) 3,834 | 1,753 | ... | 4,017 | ... | 9,605 | + 9,514 |
| Southport | 4,836 | 2,004 | 2,801 | 3,470 | 13,111 | 5,933 | 6,370 | 11,5 25 | | ... | 2,738 | ... | 14,263 | − 1,960 |
| South Shields | 7,929 | 3,263 | 2,659 | 5,370 | 19,221 | 14,931 | 313 | (h) 5,488 | 3,438 | ... | ... | ... | 8,926 | + 6,318 |
| Staly'dge, H., M., D. | 12,148 | 4,018 | 6,273 | 6,445 | 28,884 | 6,754 | ... | (h) 7,711 | 7,308 | ... | 327 | 532 | 15,878 | − 9,124 |
| Stockport | 12,436 | 3,717 | 6,437 | 4,781 | 27,371 | 33,468 | 1,326 | 5,978 | 8,363 | 910 | 6,795 | 3,208 | 25,254 | + 9,540 |
| Sunderland | 18,431 | 4,552 | 4,670 | 11,268 | 38,921 | 29,950 | 252 | (h) 7,228 | 10,366 | 476 | 7,132 | ... | 25,202 | + 5,000 |
| Wallasey | 17,249 | 4,326 | 5,695 | 10,660 | 37,930 | 20,092 | 316 | 5,522 | 4,559 | ... | 634 | ... | 10,715 | + 9,693 |
| Walsall | 7,155 | 3,034 | 4,126 | 3,913 | 18,228 | 13,201 | 1,334 | 5,164 | 3,577 | 415 | 368 | 1,119 | 10,643 | + 3,892 |
| Walthamstow | 13,413 | 2,547 | 5,204 | 7,423 | 28,587 | 10,403 | 210 | (h) 6,214 | 2,599 | ... | ... | ... | 8,813 | + 1,800 |
| Warrington | 5,529 | 1,779 | 4,255 | 3,235 | 14,798 | 8,407 | 408 | 2,580 | 3,254 | ... | ... | ... | 5,834 | + 2,981 |
| West Ham | 51,254 | 11,253 | 26,921 | 19,386 | 108,814 | 29,628 | 508 | 19,511 | 12,369 | 685 | ... | 959 | 33,524 | − 3,388 |
| Wigan | ... | ... | ... | ... | 41,318 | 31,465 | ... | 13,859 | 12,391 | ... | ... | 3,781 | ... | ... |
| Wolverhampton | 12,259 | 4,157 | 7,334 | 6,778 | 30,528 | 24,232 | (x) 1,131 | 7,788 | 5,146 | 100 | 4,915 | (a)3,637 | 21,586 | + 3,777 |
| Yarmouth (Gt.) | 7,443 | 1,867 | 2,634 | 4,388 | 16,332 | 7,801 | 95 | (h) 4,094 | 2,740 | ... | ... | ... | 6,834 | + 1,062 |

## TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | 73,836 | 13,642 | 32,519 | 23,887 | 143,884 | 110,492 | 1,363 | 45,900 | 24,541 | 2,023 | 13,000 | 1,628 | 87,092 | + 24,763 |
| Bexley | (s) 5,465 | 984 | 1,892 | 920 | 9,261 | 6,107 | ... | 2,942 | 2,325 | ... | 500 | ... | 5,767 | + 340 |
| Birkenhead | 16,099 | 4,011 | 10,380 | 9,371 | 39,861 | 25,706 | 86 | (h)11,537 | 9,501 | 269 | 4,302 | 183 | 25,792 | ... |
| Bournemouth | 22,307 | 6,912 | 9,107 | 13,967 | 52,293 | 43,719 | 723 | 10,733 | 15,371 | ... | ... | (e) 8,017 | 34,121 | + 10,321 |
| Cardiff | 37,145 | (c)10,512 | 14,894 | 17,223 | 79,774 | 65,150 | 1,529 | 24,327 | 23,079 | 750 | 6,947 | ... | 55,103 | + 11,576 |
| Coventry | 10,112 | 4,289 | 6,952 | 2,765 | 24,118 | 15,035 | 2,950 | 10,379 | 6,163 | ... | 1,258 | ... | 17,800 | - 185 |
| Glasgow | 305,400 | 122,812 | 142,988 | 48,147 | 619,347 | 392,197 | 58,631 | 81,774 | 97,077 | 13,388 | 215,757 | 9,829 | 417,825 | + 33,003 |
| Huddersfield | 26,892 | 6,064 | 22,638 | 9,933 | 65,527 | 44,182 | 61 | (h)11,749 | 10,904 | 1,630 | ... | ... | 24,283 | + 19,960 |
| Hull | 47,495 | 12,212 | 42,005 | 11,245 | 112,957 | 45,484 | 1,500 | 16,730 | 12,201 | 1,500 | (m)3,118 | ... | 33,549 | + 13,435 |
| Leeds | 109,413 | 36,055 | 39,894 | 28,455 | 213,817 | 197,714 | 7,511 | 42,197 | 49,923 | 5,021 | 41,752 | 4,957 | 143,850 | + 61,375 |
| Leicester | 47,876 | 9,447 | 22,023 | 15,633 | 95,029 | 52,642 | 2,512 | 23,252 | 12,095 | 1,939 | 7,668 | ... | 44,954 | + 10,000 |
| London | H 28,811 E 696,620 | 4,371 (r) 188,382 | 7,782 295,669 | (m)32,694 167,639 | 73,658 1,348,310 | def.11,966 946,179 | ... 29,440 | 334,173 | 369,356 | 22,858 | 138,152 | (t)26,529 | 891,068 | + 84,551 |
| N'castle-on-Tyne | 64,493 | 18,675 | 25,944 | 19,908 | 129,020 | 109,185 | 3,966 | 30,431 | 39,556 | 3,179 | ... | 6,796 | 79,962 | + 33,189 |
| Northampton | 7,254 | 3,080 | 2,489 | 3,563 | 16,386 | 11,763 | 279 | 3,481 | 4,312 | 323 | ... | (b)1,226 | 9,342 | + 2,700 |
| Portsmouth | 28,918 | 10,200 | 7,877 | 5,231 | 52,226 | 57,606 | 8,831 | 20,875 | 17,462 | 964 | 8,412 | 350 | 48,063 | + 18,374 |
| Preston | 10,781 | 4,592 | 6,263 | 2,429 | 24,065 | 19,205 | ... | 3,933 | 4,891 | ... | 3,649 | 1,358 | 13,831 | + 5,374 |
| Reading | 8,857 | 3,702 | 3,648 | 3,358 | 19,545 | 14,469 | ... | 6,714 | 4,662 | 291 | ... | ... | 11,667 | + 2,802 |
| Sheffield | 113,235 | 22,312 | 43,656 | 28,487 | 207,690 | 154,155 | 3,057 | 35,616 | 40,663 | 3,786 | 30,187 | 213 | 110,465 | + 46,748 |
| Wellington, N.Z. | 56,296 | 7,242 | 21,330 | 16,260 | 101,128 | 49,144 | 2,664 | 19,961 | 4,778 | ... | 14,068 | 4,702 | 43,509 | + 8,299 |

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £243 horse account. (q) Aid from rates £1,500. (r) Including special charges, £17,478. (s) Including £2,128 through-running expenses.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £4,386 rent of leased lines. † This item includes £734 payable to Sinking Fund of Hurst U.D.C.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBIHED GENERATIHC STATION FOR TRACTION AHD LIGHTIHC PURPOSES.

| Name. | Appropriation of Net Surplus. | | | Receipts per Car Mile. | | Operating Expenses per Car Mile. | | | | | Per-centage of Operating Expenses to Total Revenue. | Average Operating Expenses per Car Mile (excludi'g Power Costs). | Board of Trade Units. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carried Forward. | Reserve. | Contribution to Rates or Municip'l Funds. | Average Total per Car Mile. | Average Traffic per Car Mile. | Traffic. | General. | Repairs and Maintenance. | Power. (Price paid) | Total. | | | Units. | Cost per Unit. | Units used per car mile. |
| | | | | d. | d. | d. | d. | d. | d. | d. | % | d. | | d. | |
| Aberdeen ... | ... | 12,525 | ... | 11·06 | 10·92 | 2·859 | 1·298 | ·822 | ·985 | 5·964 | 53·89 | 4·979 | 2,110,964 | ·81 | 1·21 |
| Accrington ... | 460 | 3,359 | 724 | 12·57 | 12·38 | 3·09 | ·84 | ·95 | 2·10 | 6·98 | 55·55 | 4·88 | 907,721 | 1·24 | 1·70 |
| Ashton-u-Lyne ... | ... | ... | 1,350 | 11·475 | 11·186 | 2·463 | ·899 | 1·236 | 1·691 | 6·289 | 54·801 | 4·598 | 619,289 | 1·25 | 1·353 |
| Ayr... ... ... | ... | 1,175 | ... | 10·13 | 9·713 | 2·16 | 1·23 | ·99 | 1·24 | 5·62 | 55 | 4·35 | 378,570 | 1·26 | ·98 |
| Birmingham ... | ... | 45,000 | 56,352 | 10·62 | 10·492 | 2·929 | ·747 | 1·248 | 1·840 | 6·764 | 63·6 | 4·924 | 21,594,889 | 1·119 | 1·64 |
| Blackburn ... | 3,870 | ... | ... | 14·02 | 13·34 | 3·12 | ·90 | 2·61 | 2·31 | 8·94 | 56·84 | 6·63 | 2,030,535 | 1·3 | 1·81 |
| Blackpool ... | ... | 2,667 | 7,664 | 16·93 | 16·71 | 3·64 | 1·17 | 2·12 | 2·12 | 9·05 | 53·50 | 6·95 | 1,400,209 | 1·587 | 1·33 |
| Bolton ... ... | 443 | ... | 14,500 | 11·558 | 11·447 | 2·525 | ·733 | 1·354 | 1·674 | 6·286 | 54·915 | 4·612 | 4,315,448 | 1·1 | 1·52 |
| Bradford ... ... | ... | ... | 9,000 | 12·021 | 11·314 | 3·366 | ·983 | 1·859 | 1·860 | 8·068 | 67·051 | 5·687 | 11,126,989 | 1 | 1·863 |
| Brighton ... ... | 932 | ... | ... | 11·545 | 11·112 | 3·071 | ·864 | 2·758 | 1·785 | 8·478 | 73·43 | 6·693 | 1,663,126 | 1·2 | 1·49 |
| Burnley ... ... | ... | 5,791 | 8,750 | 13·226 | 13·185 | 3·098 | ·878 | 1·577 | 2·630 | 8·183 | 61·85 | 5·55 | 3,079,155 | 1·214 | 2·11 |
| Burton-on-Trent ... | ... | ... | ... | 8·61 | 7·90 | 2·81 | ·73 | 1·45 | 1·42 | 6·41 | 78·7 | 4·99 | 515,622 | 1·39 | 1·01 |
| Bury ... ... | ... | (i) 4,572 | 5,000 | 10·22 | 10·04 | 2·214 | ·685 | 1·152 | 1·290 | 5·341 | 49·91 | 4·051 | 2,039,011 | 1·081 | 1·271 |
| Chester ... ... | ... | ... | ... | 8·84 | 8·51 | 2·26 | 1·10 | ·57 | 1·55 | 5·48 | 62 | 3·93 | 397,691 | ·764 | 1·14 |
| Chesterfield ... | ... | 833 | ... | 10·10 | 9·69 | 2·24 | ·96 | 1·22 | 1·68 | 6·1 | 59·6 | 4·43 | 387,704 | 1·25 | 1·3 |
| Colchester ... | ... | ... | ... | 7·98 | 7·627 | 2·096 | ·882 | 1·313 | 1·86 | 6·151 | 76·74 | 4·291 | 401,208 | 1·5 | 1·24 |
| Croydon ... ... | ... | 7,586 | 3,000 | 8·381 | 8·207 | 2·763 | ·637 | 1·224 | 1·499 | 6·123 | 70·91 | 4·497 | 2,484,993 | 1·604 | ·938 |
| Darlington ... | ... | ... | ... | 7·651 | 7·441 | 2·633 | ·480 | 1·202 | 1·222 | 5·537 | 72·36 | 4·315 | 466,784 | 1 | 1·222 |
| Darwen ... ... | 106 | ... | ... | 14·218 | 14·204 | 3·771 | ·783 | 2·833 | 2·396 | 9·783 | 64·30 | 7·387 | ... | ... | ... |
| Derby ... ... | 6,059 | ... | ... | E 9·884 | 9·671 | 3·385 | ·541 | ·985 | 1·694 | 6·605 | 66·8 | 4·911 | 1,357,232 | 1·45 | 1·168 |
| | | | | H. 5·649 | 5·347 | 8·564 | ... | ·994 | ... | 9·558 | 169·4 | ... | ... | ... | ... |
| Doncaster ... | ... | ... | ... | 8·49 | 8·29 | 1·94 | ·44 | 2·06 | 1·86 | 6·30 | 75·1 | 4·44 | 683,855 | 1·375 | 1·35 |
| Dundee ... ... | ... | 10 | 1,500 | 11·480 | 11·189 | 2·908 | ·989 | 1·257 | 1·803 | 6·957 | 60·6 | 5·154 | 2,451,897 | 1 | 1·803 |
| East Ham ... | ... | ... | ... | 10·39 | 10·26 | 2·90 | 1·08 | 1·79 | 1·69 | 7·46 | 71·8 | 5·77 | 1,995,635 | 1·125 | 1·49 |
| Exeter ... ... | ... | 2,043 | ... | 9·272 | 9·272 | 2·498 | ·650 | ·726 | 1·937 | 5·811 | 62·67 | 3·874 | 516,793 | 1·625 | 1·192 |
| Gloucester ... | ... | ... | ... | 6·694 | 6·258 | 2·498 | ·627 | ·929 | ·784 | 4·838 | 72 | 4·054 | 472,359 | 1 | ·77 |
| Halifax ... ... | ... | ... | 7,181 | 11·816 | 11·702 | 3·023 | ·926 | 1·702 | 2·116 | 7·767 | 65 | 5·65 | 3,900,902 | 1·125 | 1·81 |
| Ilford ... ... | ... | ... | ... | 9·356 | 9·186 | 2·826 | ·636 | 1·531 | 1·476 | 6·469 | 69·2 | 4·993 | 994,999 | 1·125 | 1·31 |
| Ilkeston ... ... | ... | ... | ... | 6·73 | 6·57 | 2·36 | ·58 | 1·63 | 1·49 | 6·06 | 90·25 | 4·57 | 339,920 | 1·042 | 1·4 |
| Ipswich ... ... | 268 | ... | ... | 8·408 | 8·110 | 2·900 | ·657 | 1·442 | 1·258 | 6·257 | 74·41 | 4·999 | 672,411 | 1·25 | 1·007 |
| Keighley ... ... | ... | ... | ... | 9·721 | 9·473 | 2·736 | ·715 | ·929 | 1·532 | 5·912 | 61 | 4·380 | 248,096 | 1·5 | 1·021 |
| Kilmarnock ... | ... | ... | ... | 6·709 | 6·525 | 2·541 | ·601 | ·769 | 1·362 | 5·273 | 78·6 | 3·911 | 336,801 | 1·25 | 1·09 |
| Kirkcaldy ... | 1,370 | ... | ... | 8·22 | 7·97 | 2·398 | ·587 | ·774 | 1·337 | 5·096 | 63·95 | 3·75 | 632,581 | 1 | 1·337 |
| Lancaster ... | ... | ... | ... | 7·92 | 7·61 | 3·130 | ·664 | 1·221 | 2·269 | 7·284 | 91 | 5·015 | 228,902 | 1·7 | 1·33 |
| Leith ... ... | 2,093 | ... | ... | 8·72 | 8·51 | 2·28 | ·61 | ·91 | ·78 | 4·68 | 52·54 | 3·8 | 863,202 | ·875 | ·9 |
| Leyton ... ... | 1,478 | ... | ... | 10·365 | 10·142 | (c) 3·143 | ·964 | 1·417 | 1·711 | 7·235 | 66·241 | 5·524 | 2,542,672 | 1·078 | 1·887 |
| Lincoln ... ... | 381 | ... | ... | 10·24 | 10·05 | 2·21 | ·94 | 1·47 | 1·38 | 6·00 | 58·7 | 4·62 | 183,807 | 1·25 | 1·107 |
| Liverpool ... | ... | ... | 66,929 | 12·03 | 12·28 | 3·184 | 1·120 | 1·529 | 2·171 | 8·004 | 63·6 | 5·833 | ... | ... | ... |
| Lowestoft ... | ... | ... | ... | 8·3 | 8·3 | 2·5 | ·6 | 1·6 | 2·18 | 6·9 | 83·40 | 4·8 | 385,731 | 1·75 | 1·2 |
| Maidstone ... | ... | ... | ... | 8·19 | 7·77 | 1·942 | ·900 | ·952 | 1·55 | 5·344 | 69 | 3·79 | 358,616 | 1·25 | 1·25 |
| Manchester ... | ... | ... | 100,000 | 11·351 | 11·202 | 3·269 | 1·069 | 1·085 | 1·709 | 7·132 | 62·83 | 5·423 | 30,492,127 | 1·046 | 1·625 |
| Nelson ... ... | 1,889 | ... | ... | 12·29 | 12·23 | 2·89 | ·81 | 1·58 | 2·39 | 7·67 | 62 | 5·28 | 240,804 | 2 | 1·2 |
| Newport (Mon.)... | ... | ... | ... | 9·557 | 9·310 | 2·542 | ·994 | 1·570 | 1·746 | 7·852 | 82·26 | 6·106 | 1,239,245 | 1·28 | 1·28 |
| Nottingham ... | ... | 5,775 | 19,000 | 11·50 | 11·34 | 3·00 | 1·05 | 1·29 | 2·11 | 7·45 | 64·19 | 5·39 | 5,761,096 | 1·25 | 1·65 |
| Oldham ... ... | ... | 2,135 | ... | 12·946 | 12·645 | 3·016 | ·912 | 2·156 | 2·514 | 8·598 | 66·41 | 6·084 | 3,435,211 | 1·49 | 1·675 |
| Perth ... ... | ... | ... | ... | 8·88 | 8·46 | 3·59 | ·64 | ·43 | 1·27 | 5·93 | 59 | 4·04 | 289,473 | 1·083 | 1·17 |
| Plymouth ... | ... | ... | 3,027 | 11·253 | 11·007 | 2·346 | 1·041 | 1·488 | 2·247 | 7·122 | 63·52 | 4·875 | 1,087,297 | 1·672 | 1·34 |
| Pontypridd ... | ... | ... | ... | 10·92 | 10·78 | 2·71 | ·75 | 3·37 | 1·87 | 8·70 | 80·65 | 6·83 | 701,941 | 1·25 | 1·49 |
| Rawtenstall ... | ... | 1,550 | ... | 11·16 | 10·71 | 2·35 | ·98 | ·92 | 1·76 | 6·01 | 53·54 | 4·25 | 687,821 | 1·381 | 1·27 |
| Rochdale ... ... | 6,486 | ... | ... | 11·020 | 10·966 | 2·479 | ·691 | 1·067 | 1·533 | 5·770 | 51·2 | 4·237 | 2,250,037 | 1·016 | 1·508 |
| Rotherham ... | ... | ... | 750 | 11·950 | 11·906 | 2·996 | ·846 | 1·729 | 2·832 | 8·403 | 70·32 | 5·571 | 1,359,602 | 1·5 | 1·88 |
| Salford ... ... | ... | ... | 22,000 | 10·692 | 10·673 | 3·023 | ·729 | ·909 | 1·942 | 6·603 | 62 | 4·661 | 9,260,898 | 1·227 | 1·600 |
| Southampton ... | 8,971 | ... | 5,000 | 10·672 | 10·307 | 2·857 | ·788 | 1·418 | 2·010 | 7·073 | 66·3 | 5·063 | 1,874,217 | 1·625 | 1·266 |
| Southend-on-Sea | 2,514 | 1,000 | 6,000 | 13·14 | 12·97 | 3·03 | ·85 | 1·33 | 2·33 | 7·84 | 57·35 | 5·21 | 848,538 | 1·75 | 1·33 |
| Southport ... | ... | ... | ... | 9·827 | 9·611 | 2·495 | 1·034 | 1·446 | 1·791 | 6·766 | 70·3 | 4·9 | 545,793 | 1·50 | 1·172 |
| South Shields ... | (d) 500 | 4,218 | 1,600 | 10·066 | 9·919 | 2·253 | ·885 | ·729 | 1·566 | 5·433 | 56·26 | 4·077 | 914,188 | 1·407 | 1·122 |
| Stalybridge, &c. | ... | ... | ... | 7·880 | 7·729 | 2·686 | ·887 | 1·387 | 1·425 | 6·385 | 81·33 | 4·960 | 1,719,696 | ·9 | 1·584 |
| Stockport ... | ... | 540 | 9,000 | 10·434 | 10·221 | 2·133 | ·638 | 1·103 | ·820 | 4·694 | 44·99 | 3·874 | 1,701,943 | 1·036 | 1·218 |
| Sunderland ... | ... | ... | 5,000 | 11·208 | 11·149 | 2·999 | ·741 | ·760 | 1·834 | 6·334 | 56·81 | 4·50 | 1,764,971 | 1·5 | 1·19 |
| Wallasey ... | ... | 2,500 | 7,500 | 11·035 | 10·928 | 3·280 | ·823 | 1·083 | 2·028 | 7·214 | 65·3 | 5·18 | 1,827,115 | 1·4 | 1·45 |
| Walsall ... ... | 3,392 | ... | 500 | 11·326 | 11·038 | 2·578 | 1·094 | 1·487 | 1·410 | 6·569 | 58 | 5·159 | 780,825 | 1·25 | 1·172 |
| Walthamstow ... | 1,800 | ... | ... | 9·31 | 9·13 | 3·20 | ·61 | 1·24 | 1·77 | 6·82 | 73·32 | 5·05 | 1,188,326 | 1·5 | 1·18 |
| Warrington ... | 1,481 | ... | 1,500 | 12·398 | 12·237 | 2·954 | ·950 | 2·273 | 1·728 | 7·906 | 64·611 | 6·177 | 517,587 | 1·50 | 1·152 |
| West Ham ... | ... | ... | ... | 9·43 | 9·329 | 3·554 | ·761 | 1·823 | 1·313 | 7·451 | 78 | 6·038 | 6,103,884 | ·75 | 1·72 |
| Wigan ... ... | ... | ... | ... | 12·05 | 11·80 | ... | ... | ... | ... | 6·84 | 56·77 | 5·09 | 2,132,384 | ... | 1·471 |
| Wolverhampton ... | ... | ... | 3,777 | 11·250 | 11·086 | 2·518 | ·854 | 1·507 | 1·393 | 6·272 | 55·75 | 4·879 | 1,620,970 | 1 | 1·388 |
| Yarmouth (Gt.)... | 1,062 | ... | ... | 8·605 | 8·425 | 2·655 | ·666 | ·938 | 1·564 | 5·823 | 67·95 | 4·259 | 655,315 | 1·60 | ·974 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | * | | | | | Works Cost. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | ... | ... | 24,763 | 10·27 | 10·12 | 2·98 | ·55 | 1·31 | ·96 | 5·80 | 56·33 | 4·83 | 9,733,420 | ·589 | 1·40 |
| Bexley ... ... | 40 | ... | ... | 12·8 | 12·63 | 3·04 | ·89 | 1·75 | ·87 | 6·55 | 60·3 | 5·68 | 350,103 | ·63 | 1·37 |
| Birkenhead ... | ... | ... | ... | 12·075 | 11·89 | 3·128 | ·779 | 2·016 | 1·141 | 7·064 | 58·49 | 5·923 | 2,490,713 | ·565 | 2·016 |
| Bournemouth ... | ... | 10,321 | ... | 12·24 | 12·20 | 2·85 | ·88 | 1·16 | (b) 1·78 | 6·67 | 54·46 | 4·89 | 2,917,309 | ·583 | 1·55 |
| Cardiff ... ... | 6,926 | ... | 4,650 | 13·45 | 11·65 | 3·446 | ·976 | 1·382 | ·634 | 6·438 | 55 | 5·804 | 3,864,260 | ·415 | 1·49 |
| Coventry ... | 185 | ... | ... | 9·451 | 9·414 | 2·441 | 1·035 | 1·678 | ·668 | 5·822 | 61·6 | 5·154 | 1,533,212 | ·450 | 1·44 |
| Glasgow ... ... | ... | ... | 33,003 | 10·404 | 10·364 | 3·141 | 1·263 | 1·471 | ·495 | 6·370 | 57·88 | 5·875 | 32,280,346 | ·358 | 1·38 |
| Huddersfield ... | ... | 13,370 | 6,590 | 11·04 | 10·73 | 2·70 | ·61 | 2·28 | 1·00 | 6·59 | 59·73 | 5·59 | 5,413,488 | ·42 | 2·27 |
| Hull ... ... | ... | 1,435 | 12,000 | 9·42 | 9·33 | 2·82 | ·68 | 2·46 | ·67 | 6·63 | 71·04 | 5·96 | 4,855,082 | ·67 | 1·31 |
| Leeds ... ... | ... | ... | 61,375 | 11·229 | 11·120 | 2·985 | ·984 | 1·089 | ·776 | 5·834 | 51·95 | 5·058 | 16,461,894 | ·440 | 1·807 |
| Leicester ... | ... | ... | 10,000 | 9·675 | 8·813 | 3·137 | ·622 | 1·443 | 1·024 | 6·226 | 64 | 5·202 | 6,558,800 | ·3645 | 1·79 |
| London ... ... | ... | H. 84,551 | ... | H. 8·81 | 8·62 | 4·12 | ·62 | 1·11 | 4·67 | 10·52 | 119·40 | 10·52 | ... | ... | ... |
| | | | | E. 11·29 | 10·98 | 3·42 | ·93 | 1·45 | ·83 | 6·63 | 58·76 | 5·80 | 122,307,298 | ·61 | 2·51 |
| N'castle-on-Tyne | ... | 21,189 | 12,000 | 11·958 | 11·451 | 3·238 | ·937 | 1·302 | 1·000 | 6·477 | 52·57 | 5·477 | 9,426,563 | ·394 | 1·972 |
| Northampton ... | 500 | 1,200 | 1,000 | 10·55 | 10·21 | 2·72 | 1·15 | ·93 | 1·34 | 6·14 | 58 | 4·80 | 934,909 | ·91 | 1·46 |
| Portsmouth ... | 11,374 | (f) 5,000 | 4,000 | 12·229 | 12·035 | 3·220 | 1·136 | ·877 | ·582 | 5·815 | 47·55 | 5·233 | 2,599,210 | ·543 | 1·206 |
| Preston ... ... | ... | 5,374 | ... | 10·698 | 10·50 | 2·665 | 1·135 | 1·550 | ·600 | 5·95 | 55·63 | 5·35 | 1,516,545 | ·384 | 1·309 |
| Reading ... ... | ... | 2,802 | ... | 8·920 | 8·650 | 2·319 | ·970 | ·957 | ·880 | 5·126 | 57 | 4·246 | 1,033,313 | ·78 | ·99 |
| Sheffield ... ... | ... | 7,032 | 37,716 | 10·760 | 10·665 | 3·367 | ·664 | 1·298 | ·847 | 6·176 | 57·389 | 5·329 | 16,500,208 | ·673 | 1·837 |
| Wellington, N.Z. | 8,299 | ... | ... | 15·654 | 15·568 | 5·864 | ·755 | 2·222 | 1·694 | 10·535 | 67·3 | 8·841 | 4,921,406 | ·80 | 2·13 |

H—Horse lines. E—Electric trolley system. * The figures given under "Power" in Table II. include actual works costs only.
(b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·050d. (d) Accident, insurance, and compensation fund.
(f) Insurance fund. (i) Including Insurance.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Population Served. | Car Mileage. | Passengers Carried. | Traffic Records. Passengers Carried per Car Mile. | Average Fare per Passenger. | Average Journeys per Head of Popular'n per Annum. | Average Car Miles per Day per Car. | Traffic Revenue per Mile of Single Track. | Average Traffic Revenue per Annum per Head of Popular'n Served. | Operating Expenses per Passenger. | Average Distance of 1d. Fare. | Average Fare Charged per Mile. | Average Speed per Hour. | Average Total Car Hours per Day. | Average Number of Cars in Use Daily. | Number of Cars in Stock. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *d* | | | £ | | *d.* | *Miles.* | *d.* | *Miles.* | | | |
| Aberdeen ... | 165,000 | 1,738,966 | 19,990,711 | 11·49 | ·95 | 121·15 | 105·8 | 2,930 | 9/6 | ·519 | 1·69 | ·6 | 7·5 | 655 | 45 | 77 |
| Accrington... | 70,000 | 531,356 | 4,577,019 | 8·6 | 1·43 | 65·3 | 105 | 2,572 | 7/10 | ·81 | 1·07 | ·929 | 7·5 | 242 | 17 | 27 |
| Ashton-u-L. | 50,000 | 487,856 | 4,754,139 | 10·383 | 1·077 | 95·083 | 104 | 2,606 | 8/6 | ·606 | 1·223 | ·81 | 8 | 204 | 12 | 21 |
| Ayr ... | 33,000 | 385,986 | 3,880,850 | 10·05 | ·96 | 117 | 106 | 2,079 | 9/6 | ·558 | 1·25 | ·75 | 8 | 140 | 10 | 20 |
| Birmingham | est.850,000 | 13,134,642 | 134,467,166 | 10·23 | 1·025 | 158 | 81·06 | 5,298 | 13/6 | ·66 | 2·34 | ·366 | 7·5 | 10·44 | 485 | 511 |
| Blackburn ... | 200,000 | 1,141,161 | 11,721,367 | 10·88 | 1·27 | 58·61 | 105 | 2,564 | 6/4 | ·87 | 1·25 | ·76 | 7·50 | 434 | 31 | 61 |
| Blackpool ... | 67,500 | 1,060,115 | 12,452,820 | 12 | 1·41 | 184·48 | 89·6 | 4,321 | 21/8 | ·765 | ... | ... | 8 | ... | 32 | 72 |
| Bolton ... | 221,000 | 2,831,003 | 30,287,673 | 10·69 | 1·065 | 137·04 | 121·66 | 2,875 | 12/3 | ·588 | 1·468 | ·627 | 7·25 | 1,030 | 60 | 106 |
| Bradford ... | 354,000 | 5,971,561 | 62,005,976 | 10·383 | 1·086 | 175 | 113 | 2,703 | 15/11 | ·776 | 1·63 | ·504 | 7·3 | 2,232 | 144 | 242 |
| Brighton ... | 132,265 | 1,118,309 | 11,312,855 | 10 | 1·09 | 85·55 | 82·83 | 3,012 | 7/11 | ·84 | 1·27 | ·788 | 6·41 | 544 | 34 | 50 |
| Burnley ... | 175,000 | 1,449,647 | 15,949,359 | 11 | 1·18 | 91 | 95 | 3,620 | 9/1 | ·744 | 1·25 | ·83 | 7 | 760 | 40 | 57 |
| Burton ... | 48,000 | 437,106 | 3,188,655 | 7·30 | 1·082 | 66 | ... | 1,684 | 5/10 | ·928 | 1·506 | ·58 | 7·5 | ... | ... | 20 |
| Bury ... ... | 128,202 | 1,599,872 | 15,132,553 | 9 | 1·07 | 118·03 | 102·33 | 1,957 | 10·6 | ·535 | 1·24 | ·85 | 8·56 | 506·64 | 42·71 | 54 |
| Chester ... | 39,038 | 347,904 | 3,078,564 | 8·85 | ·96 | 2·34 | 95 | 1,944 | 6/4 | ·622 | 1·27 | ·8 | 7 | 150·6 | 10·04 | 18 |
| Chesterfield | 38,000 | 289,890 | 2,519,533 | 8·69 | 1·1 | 66 | 132 | 2,249 | 6/5 | ·702 | 1·38 | ·75 | 7·33 | 117 | 6·5 | 14 |
| Colchester ... | 44,160 | 323,524 | 1,871,896 | 5·79 | 1·32 | 42·39 | 89·3 | 1,295 | 4/8 | 1·06 | ·85 | 1·09 | 6·81 | 157·92 | 9·87 | 18 |
| Croydon ... | 170,451 | 2,657,824 | 20,504,143 | 7·74 | 1·06 | 120·29 | 125 | 4,734 | 10·7 | ·775 | 2·15 | ·50 | 7·92 | 915·82 | 58 | 75 |
| Darlington... | 58,000 | 381,920 | 3,791,835 | 9·9 | ·75 | 65·38 | 95·1 | 1,345 | 4/1 | ·557 | 1·219 | ·45 | 6·66 | 151·25 | 11 | 16 |
| Darwen ... | 40,611 | 282,710 | 2,755,011 | 10·91 | 1·24 | 67·83 | ... | 1,989 | 7/- | ·864 | ... | ... | ... | ... | ... | ... |
| Derby ... | 124,000 | E 1,161,854<br>H. 17,674 | 10,857,834<br>98,230 | 9·345<br>5·558 | 1·035<br>·962 | 87·56 | ... | 2,122<br>... | 7/7<br>... | ·707<br>1·36 | 1·44<br>1 | ·75<br>1 | 6·375<br>.. | ... | ... | 50<br>3 |
| Doncaster ... | 50,000 | 504,250 | 4,532,625 | 8·98 | ·922 | 90·65 | 115 | 1,479 | 7/- | ·702 | 1·25 | ·76 | 7·5 | 221 | 14 | 25 |
| Dundee ... | 165,000 | 1,359,821 | 17,734,162 | 13·04 | ·857 | 107 | ... | 2,305 | 7/8 | ·533 | 2 | ·50 | 7·3 | ... | ... | 68 |
| East Ham ... | 133,000 | 1,340,252 | 17,789,734 | 13·27 | ·77 | 134 | ... | 3,981 | 8/7 | ·56 | 1·63 | ·65 | ... | ... | ... | 45 |
| Exeter ... | 48,660 | 433,507 | 4,110,513 | 9·48 | ·98 | 84·48 | ... | 2,392 | 6/11 | ·612 | 1 | 1 | 6 | ... | 16 | 20 |
| Gloucester ... | 52,795 | 609,531 | 4,111,175 | 6·7 | ·92 | 77 | 92·5 | 1,059 | 6/- | ·70 | 1·5 | ·65 | 7·11 | 243 | 18 | 30 |
| Halifax ... | 176,000 | 2,152,391 | 19,456,923 | 9·04 | 1·27 | 110 | 79·5 | 1,912 | 11/11 | ·86 | 1·35 | ·84 | 6·8 | 814 | 74 | 95 |
| Ilford ... | 80,000 | 758,456 | 7,784,992 | 11·21 | ·84 | 97·31 | 130 | 2,560 | 6·10 | ·630 | 1·843 | ·69 | 8 | ... | 16 | 26 |
| Ilkeston ... | 32,000 | 238,645 | 1,732,846 | 7·25 | ·9 | 54 | 117 | 1,713 | 6/1 | ·836 | 3·2 | ·35 | 7·5 | 108 | 7·5 | 13 |
| Ipswich ... | 75,300 | 668,025 | 5,554,585 | 8·31 | ·975 | 73·76 | 65·5 | 1,518 | 6/- | ·75 | 1·53 | ·693 | 6·17 | 234·19 | 20·78 | 36 |
| Keighley ... | 42,000 | 242,919 | 2,245,120 | 9·242 | ·98 | 53·45 | 55·42 | 1,568 | 4·7 | ·639 | 2·22 | ·45 | 6·87 | 126 | 7 | 12 |
| Kilmarnock | 36,000 | 308,976 | 2,268,033 | 7·34 | ·88 | 63 | 90·34 | 1,508 | 4/8 | ·728 | 1·13 | ·86 | 7·22 | 116·5 | 9·37 | 14 |
| Kirkcaldy ... | 39,600 | 473,089 | 5,237,947 | 11·07 | ·719 | 132·27 | 59 | 1,786 | 7·11 | ·46 | 1·522 | ·64 | 7·5 | 195 | 15 | 22 |
| Lancaster ... | 41,414 | 171,475 | 1,461,104 | 8·52 | ·893 | 35 | 75 | 1,132 | 2·8 | ·854 | 1·71 | ·5 | 8 | 88·2 | 6·3 | 12 |
| Leith ... | 81,000 | 954,563 | 9,339,324 | 9·7 | ·87 | 115·30 | 123 | 1,880 | 8·4 | ·46 | 1·32 | ·72 | 8·2 | 320 | 21·33 | 37 |
| Leyton ... | 124,736 | 1,601,833 | 16,897,512 | 10·549 | ·873 | 135 | 104 | 3,324 | 9/10 | ·590 | ... | ... | 7·70 | 574·56 | 42 | 60 |
| Lincoln ... | 20,000 | 160,446 | 1,733,259 | 10·8 | ·92 | 86·66 | 64·08 | 2,264 | 6·8 | ·556 | 1·75 | ·428 | 7 | 90 | 5 | 8 |
| Liverpool ... | ... | 12,590,408 | 134,249,967 | 10·66 | 1·128 | ... | ... | 5,303 | ... | ·756 | 2·48 | ... | ... | ... | 445 | 587 |
| Lowestoft ... | 35,000 | 308,897 | 2,462,188 | 8 | 1·05 | 70·35 | ... | 2,646 | 6/2 | ·878 | univ'rs'l penny fare | | ... | ... | .. | 19 |
| Maidstone ... | 25,000 | 287,179 | 2,096,488 | 7·3 | 1·062 | 83·85 | 70 | 1,319 | 7/5 | ·73 | 1 | 1 | 6·7 | 128 | 12 | 19 |
| Manchester | 950,000 | 18,768,259 | 187,675,185 | 10 | 1·12 | 198 | 95·8 | 4,990 | 17/5 | ·713 | 2·368 | ·422 | 7·25 | ... | 537 | 629 |
| Nelson ... | 45,000 | 200,996 | 2,776,785 | 13·82 | ·88 | 61·71 | 94·09 | 2,650 | 4/4 | ·555 | 1 | 1 | 5·50 | 108 | 6 | 11 |
| Newport ... | 87,626 | 968,067 | 9,251,181 | 9·56 | ·973 | 105·6 | ... | 2,617 | 8/7 | ·821 | 1·75 | ... | ... | ... | 37 | 44 |
| Nottingham | 260,000 | 3,488,789 | 38,484,032 | 11·04 | 1·02 | 148. | 92·08 | 4,514 | 12/8 | ·67 | 1·68 | ·65 | 6·86 | ... | 104 | 135 |
| Oldham ... | 180,000 | 2,049,916 | 21,435,727 | 10·457 | 1·19 | 119·087 | 109·5 | 2,962 | 12/- | ·822 | 1·115 | ·884 | 6·84 | 820 | 51·25 | 92 |
| Perth... ... | 35,900 | 253,851 | 1,861,145 | 7·33 | 1·15 | 51·84 | 96·25 | 1,892 | 5·5 | ·72 | ... | ... | 6·25 | 120 | 8 | 12 |
| Plymouth ... | 112,000 | 809,036 | 8,666,269 | 10·71 | 1·026 | 77·377 | 93·5 | ... | 6·8 | ·667 | .. | ... | ... | 25·5 | ... | 42 |
| Pontypridd... | 40,000 | 470,215 | 4,721,110 | 10·04 | 1·07 | 118 | 83·4 | 2,457 | 10/7 | ·77 | 1·25 | ·51 | 6·5 | 234 | 18 | 26 |
| Rawtenstall | 30,516 | 539,320 | 4,669,522 | 8·66 | 1·24 | 93·39 | 123 | 1,515 | 15/9 | ·69 | 1·12 | ·88 | 9 | 16½ | 12 | 22 |
| Rochdale ... | 130,000 | 1,589,866 | 12,711,114 | 7·99 | 1·35 | 97·7 | 114·90 | 1,825 | 11/2 | ·76 | 1·07 | ·90 | 7·66 | 645 | 43 | 69 |
| Rotherham... | 64,000 | 720,133 | 7,813,922 | 10·85 | 1·097 | 122·1 | 116 | 2,977 | 11/2 | ·774 | 1·5 | 1 | 12 | 19 | 20 | 36 |
| Salford ... | 350,000 | 5,854,830 | 50,113,120 | 8·559 | 1·243 | 143 | 111 | 3,425 | 14·10 | ·77 | 1·85 | ·55 | 7·853 | 2,075·18 | 144 | 200 |
| Southampt'n | 122,200 | 1,486,746 | 12,348,658 | 8·306 | 1·241 | 101 | | 3,592 | 10·5 | ·85 | ... | ... | ... | ... | ... | 68 |
| Southend ... | 78,000 | 637,366 | 7,581,104 | 11·89 | 1·09 | 97·2 | 87 | 4,708 | 8/10 | ·634 | 1·41 | ·76 | 6·5 | 17 | 21 | 31 |
| Southport ... | 31,312 | 468,100 | 4,745,450 | 10·203 | ·945 | 151·55 | 103·7 | 1,734 | 11/11 | ·663 | 1·6 | ·620 | 6·65 | 210 | 14 | 26 |
| So'th Shields | 110,513 | 814,212 | 8,456,688 | 10·386 | ·942 | 76·5 | 129·2 | 3,332 | 6/1 | ·545 | 1·825 | ·54 | 7·61 | 282 | 16 | 35 |
| Stalybridge | 92,933 | 1,085,545 | 8,896,836 | 8·123 | ·943 | 95·7 | ... | 1,280 | 7/6 | ·779 | 1·275 | ·784 | 6·8 | ... | ... | 60 |
| Stockport ... | 120,000 | 1,399,314 | 10,665,098 | 7·6 | 1·341 | 88·8 | 76·6 | 2,158 | 9/11·3 | ·615 | 1·25 | ·72 | 7·5 | 465 | 38 | 50 |
| Sunderland ... | 170,000 | 1,474,637 | 16,972,537 | 11·5 | ·968 | 99·8 | 79·3 | 3,366 | 8/1 | ·550 | 1·34 | ·68 | 7 | 672 | 42 | 70 |
| Wallasey ... | 83,000 | 1,261,855 | 12,352,000 | 9·78 | 1·11 | 148·94 | 98·7 | 2,893 | 13/10 | ·99 | 1·89 | ·54 | 7 | ... | ... | 61 |
| Walsall ... | 100,000 | 665,964 | 5,643,798 | 8·535 | 1·293 | 87 | 57 | 1,750 | 6/1 | ·769 | 1·24 | ·77 | 7 | 315 | 21 | 39 |
| Walth'mst'w | 126,000 | 1,004,872 | 12,049,323 | 11·99 | ·762 | 95·63 | 97 | 3,052 | 6/1 | ·569 | 1·15 | ·89 | 7·2 | 408 | 36 | 38 |
| Warrington | 86,000 | 449,206 | 6,064,139 | 13·5 | ·906 | 70·513 | 102·533 | 2,372 | 5/4 | ·584 | 1·246 | ·803 | 6·408 | 192·048 | 12·003 | 21 |
| West Ham... | 294,200 | 3,544,292 | 40,200,347 | 11·34 | ·822 | 136 | 98 | 4,592 | 9/4 | ·65 | 1·80 | ·56 | 7·66 | 1,262·25 | 99 | 118 |
| Wigan ... | 200,000 | 1,449,188 | 13,018,833 | 8·98 | 1·314 | 65·1 | 105·5 | 2,309 | 7/2 | ·761 | 1·15 | ... | 7·4 | ... | 42 | 67 |
| Wolverh'ton | 135,000 | 1,168,239 | 11,913,122 | 10·198 | 1·08 | 88·25 | 87 | 2,510 | 8/- | ·615 | 1·18 | ·879 | 6·85 | 622·2 | 36·6 | 49 |
| Yarmouth ... | 55,800 | 673,027 | 4,514,871 | 6·7 | 1·256 | 80·91 | 73·7 | 1,687 | 2/6 | ·868 | 1·25 | ·76 | 7 | 375 | 25 | 35 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... | 385,492 | 5,946,659 | 58,437,942 | 9·82 | 1·07 | 151 | 128 | 2,539 | 13/- | ·592 | 1·96 | ·43 | 8·75 | 2,256 | 141 | 282 |
| Bexley ... | 16,000 | 262,658 | 2,130,189 | 8·11 | 1·56 | 133 | ... | 2,360 | 18/11 | ·95 | 1·37 | ·62 | 7·5 | ... | 8 | 16 |
| Birkenhead | 130,832 | 1,235,277 | 13,622,361 | 11·02 | 1·077 | 104·12 | 68·64 | 2,540 | 9/4 | ·702 | 1·39 | ·66 | 6·61 | 511·73 | 49·30 | 59 |
| Bournem'uth | 120,000 | 1,882,054 | 15,750,576 | 8·36 | 1·45 | 131 | 95 | 3,214 | 16/- | ·796 | 1·19 | ·87 | 6·89 | 1,140 | 60 | 81 |
| Cardiff ... | 182,729 | 2,586,421 | 27,561,652 | 10·66 | 1·09 | 151 | 98·5 | 3,947 | 13/9 | ·69 | 1·44 | ·736 | 7·5 | 1,104 | 69 | 130 |
| Coventry ... | 135,000 | 994,207 | 7,639,065 | 7·7 | 1·23 | 57 | 68 | 2,516 | 5·9 | ·757 | 1·18 | ·866 | 6·4 | 424 | 35 | 41 |
| Glasgow ... | 1,150,000 | 23,335,008 | 311,480,086 | 13·348 | ·776 | 270·85 | 105·49 | 5,139 | 17·6 | ·477 | 2·31 | ·44 | 8·13 | 8,484·59 | 606·04 | 843 |
| Huddersfield | 160,000 | (a) 2,383,858 | 21,595,569 | 9·09 | 1·18 | 144 | 120 | 3,675 | 13·4 | ·728 | 1·39 | ·70 | 7·48 | 868·32 | 54·27 | 86 |
| Hull ... ... | 287,032 | 4,040,739 | 42,907,226 | 10·64 | ·877 | 149·80 | 127·10 | 5,141 | 10/7 | ·631 | 2·75 | ... | 9 | 1,393·6 | 87·10 | 160 |
| Leeds ... | 500,000 | 8,795,465 | 89,668,185 | 10·2 | 1·088 | 179 | 113·35 | 3,594 | 16/3 | (b) ·937 | 1·95 | ·539 | 7·48 | 3,190 | 213 | 232 |
| Leicester ... | 229,296 | 3,663,215 | 32,907,795 | 8·983 | ·981 | 143 | 95 | 3,648 | 11/9 | ·693 | 2·18 | ·984 | 8 | 18 | 107 | 140 |
| London ... | ... | H 1,680,786<br>E 48,777,026 | 17,347,746<br>516,092,489 | 10·32<br>10·58 | ·84<br>1·04 | ... | 83<br>113 | 2,646<br>8,732 | ... | 1·019<br>·627 | ... | ... | 6·15<br>8·44 | 742·5<br>15,786·8 | 55<br>1,179 | 96<br>1,584 |
| Newcastle ... | 300,000 | 4,780,662 | 52,204,974 | 10·92 | 1·082 | 174 | ... | 3,738 | 15/2 | ·593 | 1·58 | ·633 | 7 | ... | ... | 192 |
| Northampt'n | 90,793 | 640,158 | 6,727,190 | 10·51 | ·97 | 76·53 | ... | 2,974 | 6/- | ·58 | 1·34 | ·7 | 6·91 | ... | ... | 26 |
| Portsmouth | 241,256 | 2,155,508 | 24,520,647 | 11·37 | 1·052 | 101·63 | 84 | 3,505 | 9/- | ·511 | 1·66 | ·62 | 7 | 1,072 | 72 | 100 |
| Preston ... | 120,000 | 970,719 | 9,567,366 | 9·85 | 1·06 | 79·73 | 132 | 2,498 | 7·2 | ·603 | 1·01 | ·95 | 7·36 | ... | ... | 33 |
| Reading ... | 76,000 | 915,180 | 8,251,274 | 9·01 | ·97 | 108 | 97 | 2,505 | 8 8 | ·57 | 1·59 | ·68 | 7 | 352 | 26 | 56 |
| Sheffield ... | 466,408 | 8,071,188 | 96,350,242 | 11·935 | ·893 | 206·535 | 103·32 | 4,606 | 15 5 | ·517 | 2·62 | ·386 | 7·372 | 3,103·27 | 214·019 | 279 |
| Wellington... | 68,000 | 2,303,913 | 23,858,412 | 11·08 | 1·40 | 350 | 90 | 4,706 | 43/11 | ·94 | 1·112 | ·88 | 7·86 | 803 | 70 | 89 |

E—Electric trolley system. H—Horse lines. (a) Including 9,417miles coal haulage. (b) Total expenses per passenger.

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## FINANCIAL REPORTS.

**Winnipeg Electric Railway Company.**—A quarterly dividend of 3 per cent. is announced, payable October 1.

**Lima Light, Power, and Tramways Company.**—The board announce a dividend of 1 per cent. for the second quarter of the year.

**Hurst, Nelson, and Company.**—The accounts for the year ended July, 1913, will permit of the arrears of preference dividend being paid up on November 11, 1913, together with dividend for the half-year ending on that date.

**Gateshead Tramways.**—An interim dividend at the rate of 5 per cent. per annum for the half-year ended June 30 has been declared on the ordinary shares. The interim dividends on the 5 per cent. and 6 per cent. preference shares will also be paid.

**Oldham Tramways.**—The accounts of the Corporation tramways for the year ended March 31 last show a net balance of £4,549, while last year there was a deficiency of £2,413. The revenue was £108,000, and £15,458 has been placed to sinking fund. Over 21,000,000 passengers were carried, and the average traffic revenue per car-mile was 12·645d. The average fare per passenger came to 1·19d. There are 92 cars. The gross capital expenditure has been £442,000, and £111,417 has been applied in the reduction of debt.

**Dumbarton Tramways First Dividend on Ordinary Shares.**—At the general meeting on September 1 the directors recommended a dividend on the ordinary shares for the first time of 1½ per cent. per annum on the issued and paid up ordinary share capital. A dividend on the preference shares at the rate of 6 per cent. per annum was also declared. Mr. George Balfour, the chairman, said the receipts for the year amounted to £22,952, an increase of £578, against which increased expenses had been incurred amounting to £1,015.

**Continued Progress at Preston.**—The annual accounts of the Corporation tramways show an increase of £2,609 in the traffic receipts as compared with the previous year, in which those of 1911 had been exceeded by £2,581, the earnings per mile being 10·50d., as compared with 10·34d., while the working expenses per mile remained at 5·96d. The surplus is £9,023, of which £3,648 has been expended in three new cars, top decks to five others, new shelter on the Garstang road, etc., leaving £5,374 to be carried to the reserve fund, which now stands at £36,840. The tramway sinking fund amounts to £42,001.

**A Portsmouth View of Municipal Tramway Deficits.**—The accounts of the Portsmouth Tramways Committee for the year ended March 31 show that a balance of £10,657 has been allocated as follows: £4,000 to the Borough Fund, £3,000 to the Fire and Insurance Fund, £350 for depreciation, and £3,306 for carrying forward. During a discussion on the advisability of halfpenny fares, Councillor Pink said the time was not opportune to take any risk by revising fares. At Glasgow, where there were halfpenny fares, there were 11 non-paying routes. Out of 94 Corporation systems he pointed out that 54 were failures owing to the fact that they tried to give too much for the money.

**Automatic Route Indicators.**—There are being introduced to the Stock Exchange the shares of the Route Recording Advertiser, Limited. The company are dealing in an automatic device for use in tramway cars and omnibuses to indicate the route. A street plan indicating all turnings and points of interest along the route moves automatically in accordance with the progress of the vehicle, about half a mile of the route being visible at a time. The company have a capital of £12,000 in five shilling shares, and the directors include Mr. Edward R. Soames, who is a director of the London Suburban Traction Company, which controls the Metropolitan Electric and London United Tramways and the M.E.T. Omnibuses.

**Ayr Tramways.**—In his annual report on the working of the Ayr Corporation electric tramways the general manager (Mr. W. Grant) states that the total revenue for the year amounted to £16,295, being the highest in the history of the department. The passengers numbered 3,880,850, an increase of 3·62 per cent. Halfpenny fares represented 55·33 per cent. of the passengers and 28·63 per cent. of the receipts, penny fares 17·86 and 18·49, and twopenny fares 12·29 and 25·46 respectively. The net balance amounted to £3,378, of which £2,040 was carried to the depreciation and renewals fund and £1,337 transferred to the burgh general assessments. The depreciation and renewals fund amounts to £9,918, while there is also a reserve fund of £5,000.

**Halifax Tramways.**—The annual report states that the amount expended on capital account at March 31 last was £412,762, and the mortgage debt stood at £299,480. The net profit was £12,680, or 1·41d. per car-mile, compared with £18,020, or 2·06d. per car-mile in the previous year, and £11,514, or 1·45d. per car-mile in 1911. The revenue was £105,973, or 11·82d. per car-mile, and the working expenses £69,661, or 7·77d. per car-mile, compared respectively with £101,893, or 11·63d. per car-mile, and £62,890, or 7·18d. per car-mile in the previous year. The route mileage was now equal to 54 miles 1,549 yards of single track, and the average energy consumption per car-mile run was 1·81 units as against 1·69 units the year before. The gross profit is equal to 8·94 per cent. on the capital expenditure, and the net profit equal to 3 per cent.

**Dick, Kerr, and Company, Limited.**—The report states that the profits earned during the 12 months to June 30 last amount to £30,092, which, added to £10,016, the sum forward, makes a total of £40,108. Out of this sum the debenture interests have been paid, and there has been reserved the sum required to provide for the premium payable on the redemption of the present debenture stock. These items absorb £11,483, leaving £28,624 available. The general meeting held on October 9 approved of the payment of a dividend of 6 per cent. per annum on the preference shares, and to carry forward £10,324. Whilst the profits for the year are sufficient to cover the payment of the debenture interest and the preference dividend, leaving the profit to be carried forward slightly larger than the amount brought forward from last year, the directors regretted that they were unable to recommend a dividend on the ordinary shares. A report of the meeting is given on page 363.

**Blackpool's Record Receipts per Car-Mile.**—The annual report of Mr. Charles Furness, general manager, Blackpool Tramways, states that the year's receipts were £74,166, and the gross profit £34,484. Compared with the previous year the receipts increased by £8,826, gross profit by £9,378, net surplus by £8,278, passengers by 1,083,491, and mileage by 107,286. Working expenses showed a decrease of £552. The receipts increased on all routes, the largest being on the circular tour, which amounted to £4,857. The average receipts per car-mile reached the record figure of 16·93d. Mr. Furness points out that the expenditure on the permanent way is an increasing factor, and, therefore, it was desirable that not less than £10,000 be allocated annually to the fund for the next five years. Since the adoption of car meters and the keeping of a complete record, a considerable saving had been effected in the energy consumption per car-mile, which was 1·33 units.

**United Electric Car Company.**—The report of the United Electric Car Company, Limited, Preston, for the year ended June 30, states that after paying debenture interest amounting to £1,783, and charging £5,950 for depreciation, the profit for the year was £10,809, to which was added £4,249, brought forward from last year, making a total of £15,058. After deducting £3,000 for preference dividend for the six months ended December 31, 1912, there was an available balance of £12,058. The directors recommend its allocation as follows: £3,000 to pay the preference dividend for the half-year ended June 30 last; £7,500 to pay a dividend of 5 per cent. on the ordinary shares for the year; and £1,558 to carry forward.—The annual meeting was held on September 17. Mr. Robert L. Barningham, the chairman, said the year's working was not so satisfactory as that of the previous year. The net profit on that occasion was the best since 1907, viz., £15,267. The past year had certainly not been a boom year in the demand for tramcars, and in the circumstances the directors considered the net profits of £10,809 satisfactory. The keen competition had mainly affected them for foreign work, and had come chiefly from American and Continental firms. The order books and prospects were slightly better than 12 months ago. They should take the earliest opportunity to build up their general reserve to provide for the loss in the realisation of the Hadley and Trafford Park works. The report was adopted, and it was decided to pay a dividend of 5 per cent. on the ordinary shares, and to carry forward £1,558. Messrs. R. H. Prestwich (Manchester) and John Kerr were re-elected directors.

**Sound Finance at Bradford.**—Interesting additions have been made by Mr. C. J. Spencer, general manager of the Bradford Corporation Tramways, to his annual report on the working of the undertaking to March 31 last, as issued in booklet form. The financial details of this, the fifteenth yearly report, were noted in the issue of this journal for July 10 last. "The operating difficulties of the Bradford tramways system," Mr. Spencer says, "are of a rather extraordinary character. From a commercial point of view the heavy operating expenses, due to steep gradients and constant wear and tear, are unavoidable, as is also the disadvantage of a very low density of population per route-mile." Having regard to these difficulties the Corporation may congratulate themselves not only on having a good service of cars, but that in addition to meeting all dues and demands they are able to contribute annually a substantial amount to the relief of rates, pay good wages, and possess a reserve and renewals fund amounting to about £90,000. Only two fatal accidents have occurred during the 15 years. The outstanding feature of the accounts is the very gratifying increase in total revenue, notwithstanding the heavy decrease in fares for early morning traffic. "The tramways department has arrived," the report says, "at what may be termed the half-way house, inasmuch as the loans for tramway purposes were granted generally for 30 years, and, as will be seen from a perusal of the accounts of the city treasurer, nearly half the capital borrowed for tramway purposes has been repaid." On the Bradford railless trolley car installation, one mile 460 yards in length, there is a loss shown on the face of the accounts. Whether this is a real loss or whether it is more than made up by increased tramway traffic it is impossible to say. The vehicles are of the pioneer type, and are to be replaced by cars of later design.



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# TRAMWAY AND OMNIBUS SHARE LIST.

## Specially Compiled for "The Tramway and Railway World."

| Amount Ranking for Dividend. | Shares. | Name. | Div'd. Prev. Half-year. | Div'd. Last Half-year. | Quotations, October 3. | Movement Since Aug. 29. Rise. | Movement Since Aug. 29. Fall. | Latest Business Done. Price. | Latest Business Done. Date. | Yield on Buying Price. £ s. d. | Dividend Due. (Final in Italics.) | Quotations, Jan., 1908, to October 3, 1913. Highest | Quotations, Jan., 1908, to October 3, 1913. Lowest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| £40,000 | 5 | Anglo-Argentine Tramways 5½% Cum. 1st Pref. | 2/9 | 2/9 | 4¼—4⅜ | ... | ... | 96/3 | Oct. 1 | 5 11 6 | Jan., Dec. | 5⅛ | 4¼ |
| 500,000 | 5 | Do. do. 5½% Cum. 2nd Pref. | 2/9 | 2/9 | 4⅜—4½ | ... | ... | 90/7½ | Oct. 2 | 5 19 0 | June, *Dec.* | 5⅜ | 4⅞ |
| 1,500,000£ | ... | Do. do. 5% Deb. Stock Red. | 5% | 5% | 98½—100½ | + 1½ | ... | 99¾ | Oct. 3 | 5 1 0 | June, Dec. | 105½ | 95½ |
| 325,532£ | Stk. | Auckland Elec. Trys. Co. 5% Mort. Deb. .. | 5% | 5% | 100—102 | ... | ... | 100 | Sept. 30 | 4 18 0 | Jan., July. | 107 | 101 |
| 75,000 | 1 | Bath Electric Tramways 5% Cum. Pref. ... | 6d. | 6d. | ⅝—¾ | ... | — ⅛ | 14/6 | Dec. 31 | 6 8 0 | *Jan. & July* | ⅞ | ⅝ |
| 334,696£ | Stk. | Birmingham Dist. Pow. & Tract. 4½% 1st Deb.... | 4½% | 4½% | 86—88 | ... | ... | 87½ | Sept. 18 | 5 2 3 | Jan., July. | 96 | 77 |
| 15,000 | 10 | Blackpool and Fleetwood Tramways ... | 9/- | 4/- | 13½—13⅝ | ... | ... | 14 | Mar. 10 | 4 14 6 | Feb., Aug. | 14½ | 12 |
| 60,000 | 10 | Bombay Elec. Supply & Trys. Co. 6% Cum. Pref. | 6/- | 6/- | 10¾—11½ | ... | ... | 11⅛ | Sept. 5 | 5 6 9 | Feb., Aug. | 12¼ | 7⅞ |
| 1,003,614 | $100 | Brazil Traction... ... ... ... ... ... | 6 | 6 | 95—96 | ... | — ¾ | 95 | Oct. 3 | 6 8 3 | Fb.My Ag.Nv. | 105¼ | 86 |
| 75,000 | 5 | Brisbane Elec. Tramways Investment Co. Ord. | 4/- | 4/- | 7⅛—7⅜ | + ⅛ | ... | 7 7/16 | Sept. 26 | 5 5 0 | *May*, Oct. | 9½ | 3 7/16 |
| 75,000 | 5 | Do. do. do. 5% Cum. Pref | 2/6 | 2/6 | 4⅛—5⅛ | ... | ... | 99 4½ | Sept. 18 | 4 17 9 | *May*, Nov. | 5⅝ | 4⅛ |
| 50,000 | 10 | Bristol Tramways and Carriage Co. ... ... | 4 | 4 | 5½—6¼ | + ⅛ | ... | 5⅛ | Nov. 9/10 | 6 8 0 | *Feb.*, Aug. | 14½ | 5 |
| 50,000 | 10 | Do. do. do. 4% Cum. Pref. | 4 | 4 | 6¾—7¼ | ... | ... | 7 | Sept. 30/12 | 5 10 6 | Jan., July. | 9¼ | 6¾ |
| 800,000£ | Stk. | British Columbia Electric Railway Def. Ord. .. | 8% | 8% | 124—127 | ... | — 2 | 126 | Sept. 29 | 6 6 0 | May, Nov. | 156 | 121 |
| 800,000£ | Stk | Do. do. Pref. Ord. ... .. | 6% | 6% | 110—114 | ... | — 1½ | 111 | Oct. 2 | 5 5 3 | Feb., Aug. | 132½ | 105 |
| 800,000£ | Stk | Do. do. 5% Cum. Perp. Pref. | 5% | 5% | 99—104 | ... | — 2 | 101 | Oct. 3 | 4 19 0 | Jan., July. | 114 | 99 |
| 1,070,097£ | Stk. | British Electric Traction Prefd. Ord. .. .. | ... | ... | 12—14 | + 1⅛ | ... | 14 | Sept. 19 | ... | Apr., *Oct.* | 16 | 8½ |
| 403,503£ | Stk. | Do. do. 6% Cum. Pref. .. | 6% | 6% | 86—89 | ... | ... | 88½ | Oct. 2 | 6 15 0 | Feb., *Aug.* | 95¼ | 78 |
| 1,464,245£ | Stk. | Do. do. 5% Perp. Deb. .. | 5% | 5% | 92—95xd | + 1 | ... | 93¾ | Oct. 2 | 5 5 3 | April, Oct. | 101 | 82½ |
| 439,796£ | Stk. | Do. do. 4½% 2nd Deb. Red. .. | 4½% | 4½% | 76—79 | + 1 | ... | 76½ | Sept. 12 | 5 17 0 | May, Nov. | 84 | 58 |
| 246,625£ | Stk. | Buenos Aires Port & City Trys. 6% 1st Mt. Deb. | 6% | 6% | 87—91 | ... | ... | 90¾ | Aug. 20 | 6 12 0 | Feb., Aug. | 103 | 61 |
| 623,270£ | Stk. | Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt Deb. | 5% | 5% | 99—101 | + 2½ | ... | 100 | Oct. 2 | 4 19 0 | Mar., Sept. | 103 | 89 |
| 137,610 | 5 | Calcutta Tramways Ord. ... ... ... .. | 2/6 | 5/- | 6—6½ | + ¼ | ... | 6 5/16 | Oct. 1 | 5 15 6 | *Apr.*, Oct. | 7½ | 4 |
| 47,295 | 5 | Do. 5% Cum. Pref. ... .. | 2/6 | 2/6 | 4⅛—5⅛ | ... | ... | 98 9 | Sept. 23 | 4 17 9 | Jan., July | 5⅜ | 4⅛ |
| 491,222 | 1 | Cape Electric Tramways ... ... ... .. | 1/- | for '12 | 1⅛—1⅜ | ... | ... | 14/6 | Oct. 1 | 6 3 3 | Feb., *Nov.* | 1⅜ | ⅛ |
| 15,000 | 10 | Carthagena and Herrerias Steam Tramways .. | 4/- | May, '13 | 3—3½ | ... | ... | 75/- | May 6 | 5 6 9 | April. | 7 | 3 |
| 248,000 | 5 | City of Buenos Ayres Tramways (1904) .. | 2/6 | 2/6 | 5¼—5⅛ | ... | — 1/16 | 5 1/32 | Sept. 26 | 4 11 0 | Fe My.Au No | 6 | 5⅛ |
| 120,000£ | Stk. | Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ... | 5% | 5% | 90½—94½ | ... | ... | 96 | Jan. 31 | 5 6 0 | May, Nov. | 101 | 87 |
| 11,500 | 10 | Cork Electric Tramways and Lighting Co. ... | ... | 6/- ann. | 4¼—4½ | ... | ... | 4⅛ | Dec. 23 | 6 6 6 | *Mar.* | 10 | 4¼ |
| 12,327 | 10 | Do. do. do. 5% Cum Pref. | 5/- | 5/- | 7⅛—7¼ | ... | ... | 8 1/16 | June 12 | 6 9 0 | Jan., July | 10⅜ | 7½ |
| 3,000 | 10 | Dublin and Lucan Elec. Railway 5% Cum. Pref | 5/- | 5/- | 8¼—8¾xd | ... | — ¼ | 9 | Aug. 25/10 | 5 14 3 | Sep.15, Mar.15 | 9¼ | 6 |
| 60,000 | 10 | Dublin United Tramways Co. (1896), Ltd., Ord. | 6/- | 6/- | 10¼—10¾ | ... | — ¼ | 10½ | Oct. 3 | 5 11 9 | Feb., Aug. | 14 | 11 |
| 60,000 | 10 | Do. do. do. 6% Cum. Pref. | 6/- | 6/- | 11⅛—12 | ... | — ¼ | 12⅛ | June 23 | 5 0 0 | *Feb.*, Aug. | 14 | 11½ |
| 13,500 | 10 | Gateshead & District Trys. Co. Ord. ... .. | 5/- | 9/- | 8½—9xd | ... | ... | 8 1/16 | Apr. 7 | 7 15 9 | *Mar.*, Sept. | 9¼ | 7⅞ |
| 268,235 | 10/- | Hastings and District Elec. Trys Ord. ... .. | ... | ... | ⅞—1 | ... | ... | 1/9 | Jan. 5/12 | ... | ... | 1⅛ | ⅞ |
| 80,000 | 1 | Do. do. 6% Cum. Pref. ... | 6% | 6% | ⅞—1xd | ... | — 1/32 | 12/6 | June 6 | 8 0 0 | ... | 1⅛ | 1/32 |
| 125,000£ | Stk. | Do. do. 4½% Deb. Stk. Red | 4½ | 4½ | 66—71xd | ... | — 2 | 68½ | Aug 19 | 6 6 9 | April, Oct. | 100 | 68 |
| $9,634,000 | $1,000 | Havana Elec. Rly. Co. Con. Mort. 5% ... ... | 5% | 5% | 94½—98½ | ... | ... | 95½ | Sept. 8 | 5 4 3 | Feb., Aug. | 105 | 80 |
| 195,000£ | 100 | Hong Kong Tramways Co. 5% Mt. Deb. .. | 5% | 5% | 87—92 | ... | ... | 89 | Sept. 29 | 5 8 9 | May, Nov. | 92 | 75⅛ |
| 20,000 | 10 | Imperial Tramways Ord. ... ... ... .. | Nil | 4% year | 3½—4¼ | ... | ... | 9¼ | Oct. 29/09 | 9 8 6 | Feb., Aug. | 9⅜ | 2¼ |
| 20,000 | 10 | Do. 6% Cum. Pref. ... ... | Nil | 6% year | 6⅛—7 | ... | — ¼ | 6 1/32 | Ju. 28/09 | 8 11 6 | Jan., July. | 9⅜ | 2¼ |
| 30,000 | 5 | Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref. | 2/6 | Dec. '12 | 2 1/16—2 1/16 | ... | — 1/16 | 46/3 | Nov. 30 | 4 17 6 | *Mar.*, Sept. | 3 | ¾ |
| 250,000 | 1 | Kalgoorlie Electric Tramways ... ... .. | ... | ... | 1/32—1/32 | ... | ... | 1/- | Jan. 15/12 | ... | *May* | 3/16 | 1/32 |
| 170,000 | 1 | La Plata Elec. Trys. Co. 6% Cum. Pref. .. | 0/4·65 | May, '13 | ¼—1xd | ... | — 1/32 | 18/6 | Sept. 22 | 6 0 0 | *April*, Oct. | 1 1/16 | ¼ |
| 30,800 | 10 | Lanarkshire Tramways ... ... ... ... | 6/- | 6/- | 9¾—10½ | ... | ... | 10 1/16 | Sept. 25 | 5 17 3 | Feb., Aug. | 10⅝ | 9⅜ |
| 250,000£ | Stk. | Lancashire United Trys. 5% Prior Lien Deb.... | 5% | 5% | 77—81 | + 2 | ... | 78⅛ | Mar. 26 | 6 5 0 | Jan., July. | 95 | 76 |
| 634,026 | 1 | Lisbon Electric Tramways Ord. ... ... ... | 7/8d. | 7/8d. | 1—1¼ | ... | — 1/32 | 22/3 | Aug. 25 | 4 16 0 | *July.* | 1⅛ | ⅞ |
| 425,553 | 1 | Do. do. 6% Cum. Pref ... | 7/8d. | 7/8d. | 1⅛—1⅜ | ... | — 1/16 | 22/6 | Feb. 15 | 5 1 3 | Jan., July. | 1½ | 1⅛ |
| 1,666,673 | 1 | London and Suburban Traction Ord. ... ... | ... | ... | ¼—⅜ | ... | ... | 6/- | Sept. 4 | ... | ... | 13/32 | ¼ |
| 1,316,268 | 1 | Do. do. do. 5% Cum. Pref | ... | ... | ⅓—⅜ | ... | — 1/32 | 12/3 | Oct. 3 | 7 12 6 | Feb., Aug. | 13/32 | 1/16 |
| 1,000,000£ | Stk. | London General Omnibus 4½% 1st Deb. ... ... | ... | 4½ | 96—98 | ... | — 1 | 96½ | Oct. 3 | 4 12 9 | Jan., July. | 98 | 92½ |
| 1,000,000£ | Stk. | Do. do. 5% Cum. Income ... | ... | 5 | 87—89 | ... | ... | 87¼ | Oct. 3 | 5 12 6 | Feb., Aug. | 94 | 87½ |
| 1,649,930£ | Stk. | London United Tramways 4% 1st Deb. Stk. .. | 4 | 4 | 60—64 | ... | ... | 60½ | Sept. 30 | 6 5 0 | *Jan.*, July. | 63 | 59 |
| 63,430£ | Stk. | Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ... | 5% | 5% | 101—103 | ... | ... | 102¾ | Mar. 7 | 4 17 3 | Jan., July. | 105 | 86 |
| 20,000 | 5 | Do. Do. Do. 6% Cum. Pref. ... | ... | ... | 4⅜—5xd | ... | — ⅛ | 87 6 | Sept. 12 | 6 0 0 | ... | 5 1/16 | 87 6 |
| 300,000£ | 100 | Manaos Trys. & Ltg. Co. 5% 1st Debs. ... .. | 5% | 5% | 87—89 | ... | ... | 87½ | Aug. 1 | 5 16 3 | Jan., July. | 97 | 86 |
| $4,785,000 | $1,000 | Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds. | 5% | 5% | 97—99 | ... | ... | 97½ | Oct. 3 | 5 4 3 | Mar., Sept. | 104⅜ | 84 |
| 60,000 | 1 | Mansfield & District Trys. Ltd. 6% Cum. Pref. | 7/8d. | 7/8d. | ⅞—1 1/32 | ... | ... | 18/6 | Sept. 24 | 5 16 3 | Mar., Sept. | 1 1/16 | ¾ |
| $16,487,400 | $100 | Mexico Tramways Common Stock ... .. | $3½ | $5½ | 91—94 | ... | — 7½ | 92 | Oct. 3 | 7 13 0 | Fb.My.Au No | 151½ | 65 |
| $3,840,000 | ... | Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds | 5% | 5% | 93—95 | + ½ | ... | 93½ | Sept. 8 | 5 11 3 | May, Nov. | 101½ | 92¼ |
| 600,000£ | 100 | Montreal Street Rly. 4½% Ster. Debs. ... .. | 4½% | 4½% | 97—99 | ... | ... | 98¾ | July 29 | 4 11 0 | Fe.My.Au.No. | 107 | 97 |
| 150,000 | 1 | National Steam Car ... ... ... ... .. | 2/- | year | 1 1/16—1 1/16 | + 1/32 | ... | 22/- | Oct. 3 | 8 8 6 | Dec. | 39/9 | 18/- |
| 5,000 | 10 | Oldham, Ashton, and Hyde Elec. Tramways Ord. | 7/- | 5/- | 6½—6¾ | + ⅛ | ... | 7 | Apr. 2 | 9 4 3 | Mar., Aug. | 9⅜ | 6¾ |
| 5,000 | 10 | Do. do. do. 5% Cum. Pref. | 5% | 5% | 5⅝—6⅛ | ... | — ¼ | 6 1/32 | July 8/12 | 8 3 3 | Feb., Aug. | 8⅝ | 6¼ |
| 77,893 | 5 | Para Elec. Rly. and Ltg. Co.. Ord. ... .. | 5/- | 5/- | 6—6½ | ... | ... | 6 1/16 | Sept. 26 | 7 14 0 | May, Nov. | 8 | 6 |
| 100,000 | 1 | Perth (W.A.) Electric Tramways Ord. ... .. | 6d. | 7½d. | 1⅛—1⅜ | ... | ... | 25/6 | Nov. 8 | 4 0 0 | *Sept.*, Nov. | 26/10½ | ⅜ |
| 245,000 | 1 | Potteries Electric Traction Ord. ... ... .. | 3½ | for '11 | 1/32—1/16 | ... | ... | 7/6 | Aug. 27 | 8 12 3 | April. | ⅜ | ⅛ |
| 245,000 | 1 | Do. do 5% Cum. Pref. ... | 6d. | 6d. | 1/16—1/16 | ... | ... | 12/6 | July 2 | 7 5 6 | *Feb.*, Aug. | ⅜ | 1/16 |
| 124,560 | 1 | Provincial Tramways Ord. ... ... ... .. | 10d. | 8d. | ⅝—¾ | ... | .. | 14/6 | June 26 | 9 12 0 | May. *Nov.* | 1 1/16 | 13/- |
| 10,000 | 10 | Do. do. 6% Cum. Pref. ... .. | 6/- | 6/- | 9⅛—9½ | ... | ... | 9½ | June 26 | 6 8 0 | June, *Dec.* | 11 | 9 |
| 50,000 | 5 | Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref | 3/- | 3/- | 5—5⅛ | ... | ... | 5 1/16 | July 17 | 5 9 3 | June, Dec. | 6 | 5 |
| 32,000 | 10 | Shanghai Elec. Construction Co. ... ... .. | 10/- | year | 9¼—10¼ | + ¾ | ... | 9¼ | Sept. 24 | 4 17 9 | May. | 11½ | 6 |
| 330,400£ | Stk. | Singapore Elec. Trys. Ltd., 5% Debs. Red. ... | 5% | 5% | 86—90xd | + 1 | ... | 87 | July 29 | 5 11 3 | Mar., Sept. | 89 | 61 |
| 169,570 | 1 | S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref | 1/2⅞ | May. '12 | ⅞—¾ | ... | ... | 15/9 | May 16, '12 | 8 0 0 | Feb., Aug. | 1⅛ | ⅞ |
| 91,720£ | Stk. | Southern Elec. Trys. of B.A., 1st Mt. Deb. ... | 5% | 5% | 93—95 | ... | ... | 94½ | Aug. 7 | 5 4 9 | Feb., Aug. | 100 | 90 |
| 471,500£ | 100 | Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ... | 4½% | 4½% | 97—99 | ... | — 1 | 99½ | Aug. 20 | 4 11 0 | Feb., Aug. | 104 | 97 |
| 80,000 | 5 | United Elec. Tramways of Monte Video, Ord.... | 3/- | 4/- | 4⅜—5 | ... | ... | 4⅝ | Sept. 22 | 7 0 0 | *June*, Dec. | 6½ | 4⅝ |
| 90,000 | 5 | Do. do. do. 6% Cum. Pref. | 3/- | 3/- | 4 1/16—5 1/16 | ... | ... | 98 9 | Sept. 15 | 5 18 6 | June, Dec. | 6⅝ | 4 1/16 |
| 500,000£ | Stk. | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs. | 4½% | 4½% | 98½—100½ | ... | — 2½ | 99½ | Sept. 22 | 4 9 6 | Apr., Oct. | 103½ | 98½ |
| 40,977 | 5 | Yorkshire (West Riding) Elec. Trys. Ord. ... | ... | ... | ⅜—⅝ | ... | ... | 5/- | Aug. 15 | ... | *Mar.* | 1½ | ⅜ |
| 46,261 | 5 | Do. do. do. 6% Cum. Pref. | 1/6 | 1/6 | 3⅜—3⅝ | ... | — ⅛ | 72/6 | Sept. 29 | 3 11 6 | *Mar.* | 3⅝ | 1¾ |

## ELECTRIC RAILWAY SHARES.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,854,720£ | Stk. | Central London Ord. Stock (4% Guar.) ... ... | ... | ... | 79—81 | ... | ... | 80½ | Oct. 2 | 4 18 9 | *Feb.*, Aug. | 89½ | 59⅝ |
| 572,640£ | Stk. | Do 4% Pref. Stock ... ... ... | 4 | 4 | 81—83 | ... | ... | 82 | Sept. 22 | 4 16 6 | Feb., Aug. | 92 | 80 |
| 572,640£ | Stk. | Do. Deferred Stock (4% Guar.) .. | .. | ... | 79—81 | + 2 | ... | 80½ | Oct. 1 | 4 18 9 | Feb., Aug. | 91⅜ | 42 |
| 78,000 | 10 | Great Northern and City Pref. Ord. 4% ... | Nil | Nil | ... | ... | ... | 42/6 | July 24 | ... | *Feb.*, Aug. | 2⅝ | ⅛ |
| 50,000 | 10 | Liverpool Overhead Ord. ... ... ... ... | 2/- | 2/6 | 4 1/16—4 3/16 | + 1/16 | ... | 80/- | Aug. 29 | 5 7 6 | *Feb.*, Aug. | 4 | ⅜ |
| 1,412,263£ | Stk. | Mersey Cons. Ord. Stock ... ... ... ... | Nil | Nil | 5¼—5⅜ | ... | — ⅜ | 5¼ | July 28 | ... | *Feb.*, Aug. | 8 | 1 |
| 5,732,062£ | Stk. | Metropolitan Cons. ... ... ... ... .. | 1½ | 1½ | 45¾—46½ | ... | — 2¼ | 46⅜ | Oct. 2 | 3 10 3 | *Feb.*, Aug. | 75⅛ | 34 |
| 2,640,914£ | Stk. | Do. Surplus Lands Stock ... .. | 2½ | 2½ | 59—61 | ... | — 1 | 60½ | Oct. 3 | 4 10 3 | *Feb.*, Aug. | 72 | 60¾ |
| 3,235,000£ | Stk. | Metropolitan District Ord. ... ... ... .. | Nil | Nil | 33½—34½ | ... | — 1½ | 33¾ | Oct. 3 | ... | *Feb.*, Aug. | 51½ | 9½ |
| 467,000 | 10 | Underground Electric Railways Co. of London | ... | ... | 3¾—4 | ... | — ⅛ | 76/3 | Oct. 1 | ... | ... | 5 5/16 | 1⅜ |
| 1,730,000£ | ... | Do. 4½% Bonds of 1933 ... ... ... | 4½% | 4½% | 99—101 | ... | ... | 100⅛ | Oct. 3 | 4 9 0 | Jan., July | 102⅜ | 73 |
| 1,192,707£ | ... | Do. 6% 1st Income Debs. ... ... .. | 6% | 6% | 110—112 | + 1 | ... | 111½ | Oct. 3 | 5 7 3 | Mar., Sept. | 117¼ | 108 |
| 6,120,750£ | ... | Do. 6% Income Bonds ... ... ... | 60/- | 60/- | 90½—91½ | ... | — 4 | 91¼ | Oct. 3 | 6 11 3 | Mar., Sept. | 97½ | 18 |

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## PERSONAL.

**Mr. C. H. Chester,** traffic superintendent of the Salford Corporation Tramways, has obtained an appointment in New Zealand.

**Messrs. Merz and McLellan,** of London, are acting as consulting engineers to Perth Council (Western Australia) in connection with the scheme for erecting a new power-house.

**Mr. W. N. Brooks,** traffic superintendent, Brighton Corporation Tramways, has been granted an increase in salary. He was appointed in March, 1909, and has since received two increases.

**Mr. E. Seckington,** traffic superintendent of the Bath Tramways Company, was presented with a silver cigarette case, suitably inscribed, by the passengers who took part in the first of the six-day motor tours.

**Sir John Courtis,** chairman of Cardiff Tramways Committee, spent the vacation in America. On attending a meeting of the Tramways Committee on October 7, Sir John was heartily welcomed.

**Mr. C. W. Shepherd,** general manager of the Edinburgh Tramways, recently underwent an operation for appendicitis at the Isle of Man, while on holiday. The operation was in every way successful.

**Mr. R. W. Willis** has resigned his position as chief assistant electrical and mechanical engineer to Swindon Corporation, in order to become principal assistant to Mr. R. A. Smith, consulting engineer, Westminster.

**Mr. H. G. Matthews,** who is referred to by a local journal as the popular manager of the Quebec Railway, Light, and Power Company, has reported that the company are making record profits, and that this year will prove to be the most successful on record.

**Mr. Stanley Dudman,** late manager of the Dartford tramways for Balfour, Beatty and Company, Limited, has been appointed to take charge of the firm's new tramways between Ripley and Nottingham. Mr. D. N. R. Bruce, late of Stroud (Glos.), has become manager at Dartford.

**Mr. A. J. Pembery,** of the india-rubber department of Siemens Brothers, Limited, Woolwich, on the completion of 50 years' service, has been presented by the firm with a purse of gold, and by the staff and employees with a gold watch and chain, and a gold mounted umbrella for Mrs. Pembery.

**Mr. J. P. Tierney,** general manager of the Dublin and Blessington Steam Tramways Company, was complimented, at the general meeting of the shareholders, in respect to his energetic efforts to improve the company's affairs. It was decided to pay a dividend at the rate of 5 per cent. per annum for the half-year.

**Mr. H. F. Friederichs,** electrical engineer to West Hartlepool Council, has had his salary increased, without application for an increment, from £450 to £500, in recognition of the great amount of work which had fallen upon him in connection with the scheme for utilising waste heat from the local blast furnaces.

**Mr. E. P. Grove** arrived at Melbourne about the middle of September to supervise the works in connection with electrification of the suburban railways on behalf of Mr. C. H. Merz. Mr. Stone, the electrical engineer to the Victorian Railways Department, will not take charge until the electrification has been completed.

**Mr. Henry Mozley,** general manager of Burnley Corporation Tramways, has accepted nomination to the position of vice-president of the Burnley and District Chamber of Commerce. He also represented that Chamber at the annual autumn meeting of the Association of Chambers of Commerce of the United Kingdom, held at Antwerp on September 16 and 17.

**Mr. Leonard Johnston,** general manager and electrical engineer, Gloucester Corporation Tramways, was on September 12 appointed tramways manager at Southampton out of 38 applicants, and entered upon the appointment about the middle of October. The salary is £400 per annum. Mr. Johnston has been at Gloucester since January, 1909, and under his management considerable improvement has been made in the service, while the financial position has also improved. He was formerly connected with the Blackburn tramways.

**Mr. J. M. McElroy,** general manager of Manchester Corporation Tramways, during September paid a visit to the Continent to study traffic conditions, in continuation of the attention which he gave to the question during the recent visit to America. Among other places he visited were Paris, Vienna, Berlin, and Hamburg. Mr. McElroy proposes to make a thorough inspection of the traffic position in London, and eventually will make a full report to the Corporation as to methods adopted in various cities, and on the question of how best to deal with the traffic problem in Manchester.

**Mr. F. J. S. Hosken,** general manager and engineer, Darwen Corporation Tramways, was the subject of a complimentary notice in a local journal in connection with his proposal (adopted by the Tramways Committee) for the issue of a return ticket on the Bolton Road section, and a penny return dinner-hour ticket on all sections to or from the Circus. The writer observed that since Mr. Hosken was appointed to the position of manager with full control he has introduced many reforms which have worked well and been appreciated.

**Mr. Alex. Hannan,** of the general office staff, Wallasey Corporation Tramways, after 12½ years' service, has left to take up an important position in Chile, and the occasion has been marked by three presentations. Mr. Hannan received from the general manager (Colonel R. R. Green, V.D.) a leather morocco lined attaché case; a silver cigarette case from the office staff; and a travelling trunk from the Tramways and Electricity Departments' Social Club, of which club Mr. Hannan had acted as hon. secretary. The presentations were made by the general manager.

**Mr. R. L. Horsfield,** tramways manager to Walsall Council, was recommended by the Tramways Committee for an increase in salary from £400 to £500 by half-yearly increments of £25. The General Purposes Committee disapproved of the recommendation, but at the September meeting of the Corporation Ald. J. Cope, chairman of the Tramways Committee, moved an amendment that his committee's recommendation should be approved, and observed that the manager had earned their confidence during the 10 years he had been with them. The amendment was lost by 12 votes to 15, the report being approved.

**Mr. W. German,** who for 14 years has been connected with the engineering and traffic departments of Blackpool Corporation Tramways, has been presented with a gold watch by his colleagues on the occasion of his departure to fill another local appointment. In making the presentation, Mr. Charles Furness, the borough electrical and tramways manager, said he was glad to learn that Mr. German had improved his position. It was on such occasions as applying for new positions that character counted, and he was happy and proud to say that the men of the Blackpool tramways department had a very high standard of character.

**Bradford Tramways Committee** have received a resolution from the local branch of the Amalgamated Association of Tramway and Vehicle Workers tendering to the chairman and members their thanks for the generous manner in which the committee dealt with an application for an advance of wages for conductors and others. Acknowledgment is made of the unfailing courtesy and consideration with which the tramways manager (Mr. C. J. Spencer) has at all times met the men, and the hope is expressed that the better conditions of service now prevailing may result in an even higher standard of service than that which has obtained in the past.

**Presentations to Mr. H. E. Blain.**—At a largely attended gathering of employees of the West Ham Corporation Tramways and their friends, Mr. H. E. Blain, who vacated the position of tramways manager recently, received further presentations on behalf of the staff. The gifts of the Employees' Social and Athletic Club were a handsome French gilt drawing-room clock with two painted china ornaments, whilst presents from the inspectors' staff were a crocodile cigar case and a gold-mounted amber cigar holder. Mr. Blain has also been the recipient of a very artistic illuminated and framed testimonial under the seal of the West Ham Corporation over the signatures of the Mayor and Town Clerk, testifying the appreciation of the Council of his services during his 10 years in West Ham.

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**Mr. C. T. Hargreaves** was killed by electric shock on August 23, at Santos, Brazil, where he was engaged with the Santos City Improvements Company. Mr. Hargreaves, who was 29 years of age, was formerly an electrician in the Blackpool tramways department.

**The late Mr. Anthony N. Brady,** the tramway, gas, and electric power promoter, who died suddenly in the Carlton Hotel, London, on July 22, left a will, which, after making ample provision for the support of the widow, divides the balance of the estate, which is estimated at £14,000,000, among five children and one grandchild.

**Mr. Frame Thomson,** who on September 28 was found dead in his house at Highgate, was to have sailed on October 3 for South America. Mr. Thomson was a director of the following companies: Alliance Investment, Anglo-Argentine Tramways (deputy-chairman), Cordoba Light, Power, and Traction (chairman), La Plata Electric Tramways, and United Electric Tramways of Monte Video (deputy-chairman). At the inquest it was stated that the deceased was extracting a cartridge from a gun he kept for shooting pigeons when the charge entered his body. The jury found that the occurrence was accidental.

**Mr. James Farley,** whose death was announced on September 13, at the age of 36, at New York, was a specialist in breaking down street car strikes. He was originally a tramway man in Philadelphia, and, it is said, came out on strike. The strike failed, and Farley's wife died from the hardships she had to endure. From that day Farley devoted his life to fighting the trade unions. At first he offered only his own services, but he soon saw the commercial possibilities of strike-breaking. He organised a staff of men who were at the same time skilled workmen and were armed with revolvers, and paid them a retainer of 4s. a day. It is stated that he has left a fortune of £100,000.

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## CONTRACTS AND ORDERS.

**Crompton and Company** have obtained a contract from Doncaster Council for the supply of feeder panels.

**Wigan Council** have given the contract for painting the tramway standards to Messrs. Dawber and Cheetham.

**Stalybridge Joint Tramways and Electricity Board** have ordered a second motor wagon from Fodens, Limited, at £521.

**Bacup Council** have given a contract to W. T. Glover and Company, Limited, for the supply and laying of 4,000 yards of cable.

**The Dunlop Rubber Company** have received a contract for the supply of solid tyres to the Sheffield Corporation's motor omnibuses.

**British Insulated and Helsby Cables** have received from the Victorian Railways Department a contract for the supply of rail bonds.

**British Westinghouse Company** have received an order for 24 gear wheels for tramcars, at £2 13s. 6d. each, from Yarmouth Council.

**The Canadian Westinghouse Company** have received a contract for the supply of three generators for the Winnipeg municipal power-house.

**Derby Council** have been recommended to make a new contract with the Bell Punch and Advertising Company for the supply of tramway tickets.

**J. W. Courtenay, Limited,** have been reappointed sole advertising contractors to the Liverpool Corporation Tramways for a long term of years.

**Babcock and Wilcox, Limited,** have received a contract for the supply of a boiler, superheater, and mechanical stoker at Southampton electricity works, at £1,661.

**Walthamstow Council** have accepted the tender of W. T. Henley's Telegraph Works Company for the supply of 550 yards of 3-core l.t. cable, at £200 10s.

**Ilford Council** have placed an order with the British Insulated and Helsby Cables for a mile of tramway trolley wire at 9$\frac{1}{16}$d. per lb., less 2½ per cent. discount.

**Siemens Bros. Dynamo Works, Limited,** have been awarded the yearly contract for the supply of "Tantalum" traction lamps for Rotherham Corporation tramways.

**An Electric Tower Wagon.**—Ilford Council have decided to purchase a motor tower wagon, equipped with the Edison storage battery, at £689, from the Edison Accumulators, Limited.

**Dundee Council** have given contracts to Bruce Peebles and Company, Limited, for converting machinery, at £1,500; and to the British Insulated and Helsby Cables, Limited, for cables.

**Bexley Council** have accepted the offer of the Hart Accumulator Company, Limited, for renewing and enlarging the battery, at £500, and a tender by Siemens Brothers for a motor-generator, at £300.

**Hobart Council** are buying a six months' supply of tramway tickets in England The estimated cost is £123, and it is declared that it would cost four times as much to have the tickets printed locally.

**Westinghouse Machine Company** have, according to American engineering journals, received a contract for the supply of three turbo-generating units, each of 30,000 KW. capacity, for the New York subway extension.

**Melbourne Municipality** have accepted the following tenders: Spare armature for 500-KW. motor generator, British General Electric Company, £200; insulated copper cables, British Insulated and Helsby Cables, Limited, £1,361.

**Salford Council** have placed contracts as subjoined: Ferranti, Limited, three-phase to two-phase switch gear, including static transformers, £1,085; Switchgear and Cowans, Limited, regulators for above switch gear, £283 10s.

**Plymouth Tramways Committee** have accepted an offer by the contractors for the supply of clothing to the tramway employees to extend the period of the contract from one to three years, and to allow a reduction of 2½ per cent. in price.

**Halifax Tramways Committee** have allotted a contract to Bolckow, Vaughan, and Company, Limited, for the supply and delivery of 200 tons of steel girder rails and 7 tons of steel fish plates, at £7 per ton, subject to the rails being made in this country.

**Mr. John Taylor,** of Strand Street, Liverpool, has recently received the following orders for his patent tubular sanding devices: County Borough of Rotherham, for 100; the Brush Electrical Engineering Company, Limited, for 20, for the Salford Corporation cars.

**Lincoln Council** have allotted contracts as appended: Willans and Robinson, Limited, turbo-alternator; Howden Boiler Company, water-tube boiler; George Robson and Company, coal elevating and conveying plant; Thornhill Brothers, extensions to the electricity works.

**Burnley Council** have placed a contract with the British Insulated and Helsby Cables, Limited, for the supply of 1,000 yards of lead-covered cable, and with the British Thomson-Houston Company for the supply of electric motors required by the Electricity Committee up to March next.

**Thermit, Limited,** have on hand at the present time tramway rail welding contracts at Bradford, Burnley, Brighton, Bournemouth, Dublin, Dundee, Huddersfield, Leeds, Liverpool, London County Council (four contracts), London United Tramways, Manchester, Sheffield, Southampton, etc.

**Wimbledon Council** have accepted the following tenders: British Thomson-Houston Company, 1,500-KW. turbo-alternator, condensing plant, pipework, and auxiliaries, £8,711; Herbert Morris, Limited, overhead travelling crane, £258; British Electric Transformer Company, one 75-KW. and one 50-KW. electric transformer, £123.

**The Albion Motor Car Company, Limited,** have received an order from the South African Government Railways for 12 32-H.P. Albions. This is the largest order ever placed by the South African Government, and is the result of the previous satisfaction they have had with the Albion vehicles which they purchased some years ago.

**Sheffield Council** have allotted contracts to Stuart and Moore for the installation of 50 patent telephonic street alarms, £4,097; Blasberg Engineering Company, supply and direction of two natural draught cooling towers, £8,779; Royce, Limited, supply and erection of three electric capstans, together with three fairleads, wire ropes, motors, etc., £1,128.

**Bournemouth Council** have placed a contract with W. Griffiths and Company, for reconstruction of tramways in Wimbourne Road, Charminster Road, and from Park Gates West to Poole terminus, including Thermit joints on each section, at £14,621 15s. There were seven tenders. The tender of Walter Scott, Limited, has been accepted for the supply of rails and fastenings, at £6,067 10s.

**Accrington Council** have placed contracts as appended: Armoured cable, W. T. Glover and Company, Limited; switch panels at Clayton-le-Moors sub-station and Rishton paper mills terminus, British Thomson-Houston Company; 250-KW. motor converter, Bruce Peebles and Company; one 100-K.V.A. and one 200-K.V.A. static transformer and one oil switch, British Westinghouse Company, Limited.

**Manchester Council** have awarded the following contracts: Water softening plant at Stuart Street Station, Kennicott Water Softener Company, Limited; construction of new meter repair workshop at the Polygon Stores, Messrs. J. Gerrard and Sons, Limited; cables, W. T. Henley's Telegraph Works Company, Limited, Callender's Cable and Construction Company, Limited, and Messrs. Johnson and Phillips.

**Warrington Council** have accepted the following tenders: Premier Accumulator Company, battery, booster, and switchboard plant for the tramways department; British Thomson-Houston Company, Limited, feeder panel, £84; Albion Clay Company, Limited, annual supply of conduits; Underfeed Stoker Company, Limited, patent underfeed stoker, with forced draught fan and motor, £258; Veritys, Limited, motor generator, £52 10s.

**Perth (W.A.) Council** have placed the following contracts: Power-station buildings, complete boiler-house equipment, and other plant, Babcock and Wilcox, Limited, £124,424; turbo-alternators, transformers, and motors, Willans and Robinson, Limited, £30,982; traction rotary converters, British Westinghouse Electric and Manufacturing Company, Limited, £9,863; condensing plant, pumps, and piping, Willans and Robinson, Limited, £23,251.

**Glasgow Tramways Committee** have accepted the following tenders: Sheet mica, Micanite and Insulators Company, Limited; armature binding wire, W. N. Brunton and Sons; scrap, zinc, lead-covered cable, brass turnings and borings, brass dust, copper and mica turnings, dry cells, J. Jackson and Company; scrap lead, brass, copper, motor field coils, armature coils, P. and W. McLellan, Limited; scrap vulcanised rubber cable, Ballardie, Holden, and Company; scrap rubber and motor tyres, City Waste India-Rubber Company; scrap old bagging, George Cunningham; altering superheaters for Pinkston power-station, Babcock and Wilcox, Limited.

**Petrol-Electric Tramcars for Hastings.**—W. A. Stevens, Limited, 26, Victoria Street, London, have received an order from the Hastings and District Tramways Company to fit several of their cars for petrol-electric propulsion as an experiment, with a view to establishing through running from Hastings to Bexhill. If the vehicles are found to run satisfactorily, 20 such cars will be required. Readers will remember that the use of the surface-contact system on two miles of the Hastings sea front has been forbidden by the Board of Trade, whose licence expired on September 6. In order to enable the test of the petrol-electric cars to be satisfactorily carried out, the company have applied to the Board for an extension of the licence, and this application has been supported by the Town Council. Three petrol-electric cars by Messrs. Stevens are now running on the East London lines of the London County Council.

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## TRAMWAY AND LIGHT RAILWAY NOTES.

**ABERDEEN.**—The Tramways Committee have adopted a recommendation of Mr. R. S. Pilcher, general manager, that six additional top-covered cars be provided to cope with the increased traffic in the city. Authority has also been given to order Brill trucks.

**BELFAST.**—Indignation has been created by the action of an auditor of the Local Government Board of Ireland in having surcharged three members of the Corporation, who, by their signatures, authorised the payment in May, 1912, of the sum of £2,800 to the tramway employees as a bonus out of the profits of the undertaking. Before adopting the plan the Corporation obtained the opinion of Mr. Stephen Renan, K.C., an eminent member of the Irish Bar, as to the legality of the step, and on his advice the Corporation felt that they were entitled to regard the step as perfectly legal. In recommending the Council to adopt the system, Mr. Nance, the general manager, said he was of opinion that profit-sharing would give the men a stronger interest in their work, increase *esprit de corps*, and promote unity between the Corporation and their tramway employees. It is said that the effect of the surcharge will be that practically every worker in the service of the tramways in receipt of a weekly wage will have his allowance reduced by an average of about 1s. 9d. per week, which will be regarded as a real grievance. The Corporation hold that the bonuses are a perfectly legitimate charge, and that a similar scheme is, in fact, pursued in some Government departments. It is stated that the surcharge will doubtless be the subject of legal proceedings.

**BEXLEY.**—The Council have agreed to a recommendation made by the tramways engineer and manager, Mr. H. P. Stokes, for 15 of the cars to be equipped with trucks of the type selected by him, at a cost of £48 per car. Of this sum £20 has been sanctioned by the Board of Trade as being necessary for the provision of electro-mechanical track brakes. It is estimated that the new trucks will effect a saving in cost of maintenance of trucks (this item at present costs £120 per annum), a saving of at least 10 per cent. in current consumption on the cars, a saving in maintenance of cars and permanent way in consequence of the easier running of the cars, and the scrap value of old material superseded. The question of placing top covers on six cars at a cost of £115 per car has been deferred for three months.

**BURNLEY.**—At the September meeting of the Council complaint was made that in July the tramways earned 11·85d. per car-mile, as against 13·16d. in the same month last year. A member also urged that they had overdone the extra service of cars altogether. Councillor Heap admitted that the figures quoted were correct, but still the Council would notice that the receipts for July were £1,000 more than in July of last year. He was satisfied, along with the manager, that when they found traffic on the road it was a mistake not to try to pick it up. The rule amongst tramway managers, when they get to a revenue of a shilling per car-mile, is to put more cars on. They carried 1,451,313 passengers, as against 1,277,764 in July of last year.

**COVENTRY.**—The Corporation have commenced the extension of the tramway depot at a cost of £20,475. The scheme provides not only for the enlargement of the depot, but also for the provision of new cars, additional cables, and signals. The new car shed will be erected alongside the existing building, and will accommodate 18 cars on six tracks, with inspection trenches. A feature of the depot will be the mess room, with a bathroom, for the employees. Much has lately been done to improve the service, but the undertaking is hampered by the narrow streets, and much of the tramway is only single track. Out of the total length of 14 miles only about two are double tracked.

**DARWEN.**—The Tramways Committee have decided to give a three months' trial from October 1 to a scheme submitted by Mr. F. J. S. Hosken, the manager and engineer, for the issue of a 2d. return ticket on the Bolton Road section, and a 1d. return dinner-hour ticket on all sections between 12 and 1 o'clock on the outward journey, the return portion to be available not later than 2 o'clock.

**DONCASTER.**—The saloon of a new car at Doncaster contains a new type of seat, the invention of Mr. E. S. Rayner, the tramways manager. It rests on legs, and can be tipped back, thus facilitating the cleaning of the floor. The space underneath gives room for

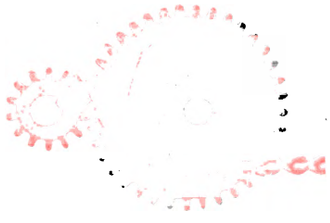

5.258 BRAKES SOLD IN 90 DAYS!

Note the STOPS which form the special feature of The "Peacock"

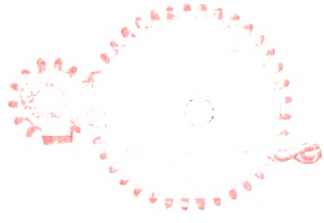
IMPROVED BRAKE

(Patent),

and prevent the drum from over-running on release.



READY TO WIND.



WINDING.

Metropolitan Building,
New York City, August 26, 1913.

J. McI. Cater, Manager,
Peacock Brake Co.,
London, England.

Dear Mr. Cater:

It affords me pleasure and is only fair to inform you that the Peacock Improved Brake, shipped by you from England last Fall, was tested under the supervision of the Public Service Commission of this State, and was awarded the highest percentage for efficiency over all other hand-geared brakes - and, rest assured; they were all there. The outcome of this test resulted in the National Brake Co., of Buffalo, N. Y., immediately purchasing the rights from me to manufacture and sell the Peacock Improved Brake in the United States.

We have thus far only shown it to the companies mentioned below who have purchased the following number of brakes within the last ninety days.

| | |
|---|---|
| The Brooklyn Rapid Transit Co. | 4036 |
| Second Avenue Railway Co. | 550 |
| New York Street Railways Co. | 440 |
| Third Avenue Railway Co. | 102 |
| Belt Line Railway Co. | 80 |
| Manhattan & Queens | 50 |
| Total Number Brakes Sold | 5258 |

To my mind your success in Europe, and the initial sales in the United States, speak well for the future of the Peacock Improved Brake.

Yours sincerely,

For full particulars of the "Peacock" IMPROVED Brake write for new catalogue to

THE "PEACOCK" BRAKE CO., 27, Clements Lane, LONDON, E.C.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parcels. Mr. Fearnley, of Sheffield Tramways, has adopted the seat for future use.—A car of unusual length for Doncaster has been introduced into traffic. It seats 74 passengers, the body being mounted on a Peckham radial truck, which passes round curves with greater ease than an ordinary single-truck car, while the latter seats only 52 persons. Six other cars for which an order has been placed will have the Peckham pendulum truck. The makers of the trucks are the Brush Company, while the bodies are the work of the United Electric Car Company.

**GLASGOW.**—For the first quarter of the financial year of the Glasgow Corporation Tramways ended on August 31 the traffic receipts are £19,000 above the corresponding period of last year. The number of passengers carried increased by 6,000,000. At the tramway works new cars are being made at the rate of about 10 each week in an order for 100 vehicles. The department are also busily engaged placing vestibules on the whole stock. Already 300 have been thus dealt with. There are now only some 50 of the old converted horse-drawn cars in the service, and they are used only at times of pressure.

**LEEDS.**—The Tramways and Electricity Committee have arranged to purchase 4,625 square yards of land, at Guiseley, for the purpose of an additional depot and sub-station, at the price of 2s. per yard. £45,000 is to be expended on new cars and installing side life-guards.

**LIVERPOOL.**—By the construction of three new curve junctions, without the addition of any straight line, a new circular and alternative route is to be instituted. This will connect the centre of the city with Netherfield Road and the north docks, forming practically a duplicate track. For the round journey of five miles twopence will be charged. The route will probably be opened before the end of the year, Mr. J. A. Brodie, the engineer, beginning the work as soon as possible.

**MANCHESTER.**—Although hardly more than a third of the people who signed the memorial in favour of the all-night hourly service have made use of the cars, Alderman Bowes, chairman of the Tramways Committee, states that they intend to go on with the facilities for three months, keeping an accurate account of the cost and use. The committee did not expect a profit, but did not want a serious loss.

**NEWCASTLE-ON-TYNE.**—In his annual report Mr. Ernest Hatton, general manager of the tramways, indicates that this year the reserve and renewals fund will be heavily drawn upon, it being imperative to renew considerable lengths of track and several junctions. Additional plant has been provided at the power-station to meet the increasing demand for power. Mr. Hatton says that the undertaking has now reached a stage when renewals must be encountered annually and not occasionally, as in the past. While there was no occasion for doubt and uneasiness as to whether the undertaking could meet these expenses, so long as a firm policy was pursued in resisting all attempts to deplete the net annual revenue by saddling it with still heavier charges than it now carried, on the other hand, if that policy were not pursued, the undertaking might eventually have to be supported out of the rates.—Portions of the permanent way are being renewed with Sandberg rails weighing 110 lb. per yard. To prevent water from finding a lodgment under the rails a packing is being utilised of steel slag broken to 1¼ in. gauge and combined with a pitch mixture. A large number of central standards are being replaced with span wire overhead equipment.

**OLDHAM.**—In connection with track maintenance, the annual report on the Oldham tramways mentions that a number of steel paving blocks have been laid in Union Street for experimental purposes. The net working expenses of the Oldham undertaking per car-mile were 6·084d. as compared with 4·528d. five years ago. Maintenance and equipment were more costly than a few years ago, being 2·11d. per car-mile.

**SHEFFIELD.**—The "Tudorweld" is being applied to rails which are worn at the joints, but which are otherwise in a good condition. The welding of rails by other processes has been carried on in Sheffield during the last three years, and although many of the welds were done during the hot summer of two years ago, and there are now some thousands of welded joints in use, there has not been a single breakage.

**SOUTH YORKSHIRE.**—Wath, Bolton, Wombwell, and Thurnscoe Councils are combining in the consideration of a joint municipal tramway scheme, with possibilities of extension in the direction of Mexborough and Barnsley. Mr. J. L. Hawksworth, clerk to the Bolton-upon-Dearne Council, has been appointed clerk to the joint authorities. In connection with the scheme, Messrs. Bury and Walkers have been appointed solicitors. A well-known Westminster engineer is acting as adviser to the authorities.

**STIRLING.**—The Town Council on September 16 received a letter from Mr. G. Balfour, of Messrs. Balfour, Beatty, and Company, regarding his proposals for the electrification of the tramways. He was prepared to pay the sum of £28,642 for the electricity undertaking to cover the unredeemed debt on the undertaking, an additional sum of £2,250 to refund the Council the difference in accumulated debit balances, accumulated up to the year 1908, and the credit balances carried to reserve since that date; and, in addition, a sum in cash of £2,000, making a total of £32,892. Mr. Balfour also promised a reduction in the charges for current. The matter was adjourned for consideration.

## PATENT LIST.

**Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.**

*** If the inventions have been communicated the names of the communicators are given below in italics.

### APPLICATIONS.

Applications for Letters Patent have been filed:

19,218 Life-guards for motor omnibuses—P. C. Sarapata.
19,289 Apparatus for preventing the derailing of locomotives—W. H. Pickles.
19,303 Hanger-straps for interior of tramcars, motor omnibuses, etc.—J. Whitehead, sen., and H. J. Whitehead, jun.
19,334 Superheaters—H. A. Stenning and Schmidt Superheating Company (1910), Limited.
19,414 Tramcar seat—H. Barrow.
19,528 Reversible seats for tramcars, etc.—J. W. P. Page.
19,585 Car trucks—M. E. Curwen (*J. G. Brill Company*).
19,586 Life-guard for motor omnibuses—G. Norris.
19,603 Insulative rail joints—B. R. Wills and J. C. Sykes.
19,640 Electric railways—A. L. Simon.
19,691 Seats for tramcars, motor omnibuses, etc.—A. L. Barber.
19,702 Seat cover for omnibuses and tramcars—W. J. Hickman.
19,842 Automatic brake adjuster for tramway vehicles—E. Peckham and S. Thomas.
19,935 Brake blocks—E. C. Harmes.
20,025 Construction of omnibuses, tramcars, etc.—C. F. Newman.
20,045 Rail and road vehicles—C. W. Mallins.
20,046 Rail and road vehicles—C. W. Mallins.
20,062 Automatic seat cover for motor omnibuses—J. M. Walsh.
20,125 Route indicators—P. Bobichon.
20,127 Car trucks—H. H. Hewitt.
20,149 Life-saving device for omnibuses and tramcars—P. Berry.
20,284 Trolley poles—C. C. Wallace and C. A. Macey.
20,296 Brake shoes—W. C. Fisher.
20,436 Rail joints—E. A. Byrde.
20,494 Guard for motor omnibuses—F. Tanner.

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"Motormen's Oilskins supplied by you gave every satisfaction."
"The oilskin coats we now use are entirely confined to the 'Ailsa' manufacture."
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"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

J. H. Butcher & Co.
TRANSFER
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20,747 Process for making steel car wheels—H. R. Keithley.
20,768 Self-sanding slipper brake block—W. E. Klemm.
20,832 System of automatic train control—J. M. McIntosh.
20,911 Rail joints—P. T. Corbin.
21,067 Tramcars—G. Ashton.
21,165 Railway fish plates—W. G. Delamain.
21,203 Hoods or coverings for omnibuses—E. C. R. Marks (*H. Adler*).
21,347 Street car fenders—R. H. Pogue.
21,388 Electric signalling system for railways—T. D. Parr.
21,419 Systematic device for railway signalling—W. Harding, junr.
21,420 Automatic emergency railway signalling apparatus—P. T. Haslam.
21,705 Apparatus for controlling the running of railway trains—E. J. Hartenfeld and W. Chaloner.
21,753 Life-guard and safety attachments for tramways, etc.—J. T. Bateman.

### Specifications Published.

1912.

22,696 Trolley pulleys of electric tramcars—Warren and Mort.
24,263 Trolley arms—R. Dempster and Sons, Limited, and Broadhead.
19,090 Axle boxes for railway and tramway vehicles—Preston.
21,448 Route indicators—Jones.
21,988 Axle boxes for tramway and railway vehicles—Birkby and Birkby.
29,186 Railway and tramway rolling stock—De Bange.
16,549 Trolleys—Tetlow.
24,465 Tramcar passenger register—Priestman and Nell.
19,560 Apparatus for checking the fares of passengers by trams—Betteley.
19,585 Electric signalling systems Dawson and Buckham.
20,930 Apparatus for working brakes—Anger.
16,678 Signalling apparatus for railways—Jennings.
19,851 Elevated suspension railways—Paelman.
19,852 Cars for elevated railways of the suspension type—Paelman.
19,887 Track sanders for tramcars—Carroll, Chilton, Brown and Edmiston.
20,275 Fixing of rails on permanent way—Henry.
21,507 Detonator apparatus for signalling on railways—Hosker.
26,344 Electric railway systems—Purvis and Gritman.

1913.

2,377 Sanding apparatus for power-driven vehicles—Douglass.
9,778 Rail joints—Yordon.
14,002 Fluid-pressure braking and rail-sanding apparatus—Turner.
4,190 Automatic signal system for railways—Perry.
5,464 Railway sleepers and fastening for rails—Baughman.
9,066 Braking contrivances for tramcars—Van der Straeten.
10,063 Railway signalling—Tarrant and Sykes.
374 Railway sleepers—McLean.
7,535 Car journal boxes—Berry.
14,001 Fluid-pressure brakes—Turner and Donovan.
14,155 Means for uniting adjacent ends of railway rails—Wentz.
16,920 Railway signals—Stockdale.

## DICK, KERR AND COMPANY, LIMITED.

The annual meeting of this company was held in Cannon Street Hotel, London, on October 9, Mr. Claud T. Cayley presiding.

The Chairman, in moving the adoption of the directors' report (a summary of which appears among our financial paragraphs), said he was glad to be able to meet the shareholders with a better showing of results than was the case last year, although they were not yet in the position in which they would all like to be. In a business such as theirs, with interests in many varied branches and all over the world, he would be a bold man who predicted results in advance, especially in view of the labour, financial, and political complications existing at the present time. In the balance sheet the item of "capital expenditure at the works, including goodwill and patents," showed a reduction of over £7,000, which represented the amount by which the depreciation exceeded the additional capital expenditure for the year. No doubt they would regard that as a satisfactory feature in the accounts. Although they had been obliged to face a considerable diminution in their profits in recent times, the directors had consistently adhered to what they believed to be a sound and conservative policy in regard to depreciation at the works. Then "stocks on hand and work in progress," which referred only to the manufacturing side of the business, showed an increase of £31,000 over last year. This was the high-water mark on this account in the history of the company, and it might be regarded as a favourable sign. Taking the "debtors," "bills receivable," and the outstanding balances on contracts together, these assets had increased to the extent of £71,753 as compared with last year. Turning to the liabilities side the only change of importance was the "loan from bankers, £100,000." In order to arrive at an explanation they must look at the other floating liabilities, and they would see that the creditors, bills payable, and loans (other than bankers' loans) showed an increase of about £12,500 on last year, as against the increase of £71,753 in the corresponding assets on the other side—namely, debtors, bills receivable, and contract balances. There was, therefore, a net increase of assets over liabilities on these accounts of nearly £60,000. Then they had to take into consideration the increase in the value of their stocks and work in progress—namely, £31,000. The demand for extra working capital was the result of expansion in their manufacturing branches. He knew of no branch of the heavy engineering trades in which the custom in respect to payments was so severe. They were extremely busy in the works; in fact, they had never had more work than at the present time, and he hoped and believed that it would prove to be more satisfactory work than they had had for a very long time. With such a large amount of work in hand and under contract the weekly expenditure in wages and material was very large, and a large amount of capital was consequently locked up. The board considered that the business as a whole was most satisfactory.

Mr. R. H. Prestwich seconded the motion.

The Chairman, replying to questions, said that the item of capital expenditure at the works, including goodwill and patents, £611,393, £226,000 represented goodwill and patents. The directors of the company probably held one-half of the ordinary share capital, and they regretted extremely the fact that they were not receiving a dividend. As a result of hard work, they had succeeded in increasing the profit from £2,000 or £3,000 last year to nearly £30,000 this year, and if the ordinary shareholders exercised patience he hoped that some day they would be able to pay them a dividend. The report was adopted.

# TRAFFIC RETURNS.

## Colonial and Foreign Tramways.

| NAME OF COMPANY. | 1912. WEEKS ENDING. | | | | | 1913. WEEKS ENDING. | | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aug. 31. | Sept. 7. | Sept. 14. | Sept. 21. | Sept. 28. | Aug. 30. | Sept. 6. | Sept. 13. | Sept. 20 | Sept. 27. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Anglo-Argentine ... ... ... | 48,310 | 53,467 | 50,815 | 53,280 | 51,860 | 53,074 | 56,592 | 50,168 | 56,344 | 55,030 | 39 | 2,155,720 | +178,927 |
| Auckland ... ... (28 days) | 18,602 | ... | ... | ... | ... | 19,543 | ... | ... | ... | ... | 8½ | 41,610 | + 1,150 |
| Brazilian Street ... (month) Mlrs. | 40,419 | ... | ... | ... | ... | 50,402 | ... | ... | ... | ... | 5 | 50,402 | + 9,983 |
| Brazilian Traction ... ... ... | 82,056 | 86,018 | 86,313 | 86,201 | 83,440 | 92,059 | 97,213 | 99,064 | 93,972 | 94,508 | 39 | 3,489,160 | +490,276 |
| Brisbane ... ... ...(month) | 27,680 | ... | ... | ... | ... | 29,970 | ... | ... | ... | ... | 35 | 207,178 | + 48,784 |
| British Columbia ... (month) $ | 675,272 | ... | ... | ... | ... | 770,628 | ... | ... | ... | ... | 9 | 1,526,571 | +201,054 |
| Buenos Aires Port and City (month) | 5,860 | ... | ... | ... | ... | 6,403 | ... | ... | ... | ... | 35 | 52,476 | + 2,293 |
| Buenos Ayres Lacroze ...(month) | 41,677 | .. | ... | ... | ... | 44,462 | ... | ... | ... | ... | 9 | 89,684 | + 6,009 |
| Calcutta ... ... ... Rs. | 59,244 | 62,844 | 67,616 | 65,444 | 66,634 | 63,712 | 71,278 | 70,506 | 81,096 | 70,896 | 39 | 25,17,192 | +1,40,559 |
| Cape Town ... ...(month) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Carthagena and Herrerias (month) | 2,151 | ... | ... | ... | ... | 2,192 | ... | ... | ... | ... | 35 | 23,317 | + 6,983 |
| East India (Simplex petrol) (month) | 1,922 | ... | ... | ... | ... | 2,005 | ... | ... | ... | ... | 5 | 2,005 | + 83 |
| Kalgoorlie ... ...(month) | ... | .. | ... | ... | ... | 3,357 | ... | ... | ... | ... | 35 | 23,379 | -- |
| La Plata ... ... ...(month) | 3,601 | ... | ... | ... | ... | 4,641 | ... | ... | ... | ... | 35 | 40,983 | + 9,040 |
| Lima ... ... ...(month) | 31,828 | ... | ... | ... | ... | 33,900 | ... | ... | ... | ... | 35 | 266,537 | + 12,333 |
| Madras ... ... ... Rs. | 26,683 | (2 weeks) | 26,776 | (2 weeks) | 23,810 | 28,084 | (2 weeks) | 29,097 | (2 weeks) | 24,881 | 39 | 4,84,183 | + 35,047 |
| Melbourne ... ...(month) | 59,000 | ... | ... | ... | ... | 58,000 | ... | ... | ... | 62,000 | — | — | — |
| Mexico ... ... (month) $ | 578,658 | ... | ... | ... | ... | 635,445 | ... | ... | ... | ... | 35 | 4,511,587 | + 90,889 |
| Montevideo ... ...(month) | 26,249 | ... | ... | ... | ... | 28,829 | ... | ... | ... | ... | 44 | 316,431 | + 26,324 |
| Para ... ... ... .. | 3,730 | 3,807 | 3,853 | 3,834 | 3,695 | 3,553 | 3,890 | 3,633 | 3,622 | 3,455 | 43 | 171,575 | + 988 |
| Port Elizabeth ... ...(month) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Shanghai ... ... ... $ | 18,840 | 21,435 | 20,913 | 20,265 | 22,172 | 23,400 | 25,000 | 24,000 | 24,800 | 25,200 | 38 | 833,652 | + 92,481 |
| Singapore ... ... ... $ | 10,069 | 10,702 | 11,770 | 10,296 | 9,979 | 12,089 | 14,459 | 12,141 | 12,439 | 11,771 | 39 | 464,180 | + 58,925 |
| Toronto ... ... (month) $ | 727,925 | ... | ... | ... | ... | 850,222 | ... | ... | ... | ... | 35 | 6,317,674 | +864,574 |
| Winnipeg ... ... (month) $ | 303,764 | ... | ... | ... | ... | 340,507 | ... | ... | ... | ... | 35 | 2,649,702 | +221,872 |

(Continued on page 364.)

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# TRAFFIC RETURNS—*continued.*

## Tramways and Omnibus Undertakings in the United Kingdom.

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | | 1913. WEEKS ENDING. | | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aug. 31. | Sept. 7. | Sept. 14. | Sept. 21. | Sept. 28 | Aug. 30. | Sept. 6. | Sept. 13. | Sept. 20. | Sept. 27. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Aberdeen Corporation ... ... | 1,698 | 1,903 | 1,512 | 1,606 | 1,609 | 1,922 | 1,896 | 1,707 | 1,644 | 1,700 | 17 | 29,459 | + 1,873 |
| Ayr Corporation ... ... .. | 405 | 285 | 326 | 680 | 281 | 505 | 382 | 384 | 932 | 332 | 19 | 9,878 | + 1,253 |
| Bath Electric ... ... .. | 1,116 | 1,053 | 1,030 | 1,127 | 985 | 1,358 | 1,238 | 1,199 | 1,113 | 1,075 | 39 | 38,611 | + 2,929 |
| Birkenhead Corporation ... .. | 1,332 | 1,151 | 1,223 | 1,183 | 1,174 | 1,370 | 1,281 | 1,259 | 1,314 | 1,450 | 26 | 34,015 | + 3,453 |
| Birmingham Corporation ... .. | 10,649 | 10,755 | 10,602 | 10,888 | 11,297 | 11,562 | 11,708 | 12,047 | 12,216 | 13,096 | 26 | 299,185 | + 23,376 |
| Blackburn Corporation ... .. | 1,125 | 1,202 | 1,246 | 1,291 | 1,217 | 1,278 | 1,476 | 1,532 | 1,261 | 1,421 | 26 | 35,077 | + 3,289 |
| Blackpool and Fleetwood ... .. | 1,431 | 1,789 | 1,623 | 1,250 | 1,113 | 1,981 | 2,233 | 2,009 | 1,585 | 1,214 | 13 | 24,747 | + 3,917 |
| Blackpool Corporation ... .. | 2,587 | 3,351 | 3,061 | 2,642 | 2,365 | 3,494 | 4,296 | 4,498 | 3,095 | 2,589 | 25 | 65,187 | + 9,906 |
| Bolton Corporation ... .. | 2,571 | 2,685 | 2,571 | 2,636 | 2,455 | 2,778 | 3,212 | 2,697 | 2,780 | 2,802 | 26 | 71,867 | + 4,118 |
| Bournemouth Corporation ... | 2,589 | 2,366 | 2,273 | 2,055 | 1,872 | 2,846 | 2,817 | 2,534 | 2,387 | 2,203 | 26 | 61,290 | + 7,240 |
| Bradford Corporation ... .. | 5,327 | 5,542 | 5,409 | 5,774 | 5,577 | 6,017 | 5,892 | 6,391 | 5,743 | 5,995 | 26 | 156,243 | + 9,561 |
| Brighton Corporation ... .. | 1,279 | 1,265 | 1,175 | 1,110 | 1,026 | 1,485 | 1,378 | 1,368 | 1,254 | 1,272 | 26 | 31,943 | + 2,083 |
| Bristol ... ... ... .. | 7,721 | 8,006 | 7,413 | 7,775 | 7,284 | 8,921 | 9,202 | 8,710 | 9,279 | 8,447 | 38 | 313,289 | + 43,995 |
| British Electrical Federation .. | 52,568 | 41,550 | 39,293 | 40,412 | 40,015 | 55,952 | 52,430 | 55,420 | 53,993 | 55,914 | — | — | — |
| Burnley Corporation ... .. | 1,538 | 1,584 | 1,615 | 1,678 | 1,507 | 1,661 | 1,688 | 1,984 | 1,660 | 1,791 | 39 | 44,966 | + 5,630 |
| Burton-on-Trent Corporation .. | 296 | 269 | 265 | 262 | 267 | 311 | 298 | 296 | 295 | 303 | 26 | 7,669 | + 336 |
| Bury Corporation ... ... .. | 1,320 | 1,270 | 1,332 | 1,413 | 1,280 | 1,410 | 1,424 | 1,377 | 1,419 | 1,456 | 22 | 35,925 | + 1,387 |
| Cardiff Corporation ... ... .. | 2,571 | 2,507 | 2,572 | .. | ... | 2,969 | 2,906 | 2,959 | ... | ... | 24 | 66,909 | + 7,534 |
| Chatham and District ... .. | 949 | 931 | 863 | 908 | 898 | 1,099 | 992 | 1,021 | 1,031 | 1,020 | 38 | 35,590 | + 2,114 |
| Chesterfield Corporation ... .. | 228 | 226 | 213 | 236 | 225 | 265 | 253 | 256 | 258 | 259 | 25 | 6,668 | + 843 |
| Colne and Trawden ... .. | 273 | 270 | 302 | 291 | 274 | 300 | 305 | 350 | 268 | 292 | 39 | 10,819 | + 716 |
| Cork Electric ... ... .. | 498 | 510 | 510 | 518 | 474 | 530 | 558 | 563 | 501 | 530 | 38 | 19,289 | + 351 |
| Croydon Corporation ... .. | 1,743 | 1,791 | 1,752 | 1,800 | 1,833 | 1,663 | 1,530 | 1,641 | 1,716 | 1,793 | 25 | 43,335 | — 4,807 |
| Darlington Corporation ... .. | 233 | 230 | 222 | 222 | 215 | 267 | 245 | 258 | 250 | 268 | 26 | 6,538 | + 663 |
| Derby Corporation ... .. | 933 | 995 | 859 | 947 | 890 | 1,070 | 1,084 | 995 | 965 | 1,066 | 26 | 26,020 | + 2,779 |
| Dover Corporation ... .. | 323 | 287 | 257 | 255 | 249 | 418 | 299 | 302 | 275 | 288 | 26 | 7,072 | + 87 |
| Dublin and Lucan ... .. | 162 | 176 | 165 | 173 | 161 | 166 | 158 | 143 | 119 | 119 | 12½ | 2,190 | + 66 |
| Dublin United ... ... .. | 6,917 | 6,323 | 5,947 | 5,888 | 5,562 | 5,361 | 2,917 | 3,111 | 3,162 | 3,310 | 38 | 220,388 | — 6,100 |
| Dundee City ... ... .. | 1,255 | 1,309 | 1,402 | 1,261 | 1,249 | 1,382 | 1,425 | 1,332 | 1,309 | 1,327 | 19 | 25,376 | + 1,893 |
| East Ham Corporation ... .. | 1,121 | 1,086 | 1,035 | 1,048 | 1,067 | 970 | 973 | 987 | 984 | 982 | 26 | 26,565 | - 1,152 |
| Exeter Corporation ... .. | 385 | 367 | 369 | 363 | 332 | 412 | 379 | 404 | 369 | 366 | 26 | 9,388 | + 404 |
| Gearless Motor 'Buses ... .. | ... | ... | ... | ... | ... | 605 | 537 | 631 | 605 | 645 | 25 | 12,088 | — |
| Glasgow Corporation ... .. | 19,197 | 19,249 | 19,164 | 20,140 | 19,400 | 20,269 | 20,458 | 20,439 | 20,873 | 21,110 | 17 | 339,169 | + 23,265 |
| Glossop (Urban Elec. Supply Co.)... | 130 | 123 | 128 | 139 | 121 | 135 | 134 | 149 | 140 | 136 | 39 | 5,075 | + 560 |
| Halifax Corporation ... .. | 1,901 | 2,123 | 1,985 | 2,128 | 2,127 | 2,217 | 2,227 | 2,216 | 2,163 | 2,180 | 25 | 55,376 | + 1,156 |
| Hastings and District ... .. | 1,436 | 1,421 | 1,344 | 1,339 | 1,184 | 1,804 | 1,500 | 1,462 | 1,348 | 1,285 | 39 | 41,959 | + 2,973 |
| Huddersfield Corporation ... .. | 1,965 | 2,151 | 1,917 | 2,097 | 2,166 | 2,142 | 2,094 | 2,362 | 2,048 | 2,328 | 26 | 56,199 | + 3,518 |
| Hull Corporation ... ... . | 3,007 | 3,051 | 2,875 | 2,910 | 2,926 | 3,025 | 3,054 | 3,090 | 3,127 | 3,202 | 26 | 79,445 | + 3,921 |
| Ilford U.D. Council ... . | 463 | 450 | 416 | 417 | 408 | 449 | 439 | 460 | 445 | 458 | 26 | 11,931 | — 1,505 |
| Ilkeston Corporation ... . | 126 | 128 | 129 | 122 | 124 | 139 | 142 | 140 | 138 | 147 | 27 | 3,609 | + 617 |
| Ipswich Corporation ... . | 537 | 519 | 471 | 488 | 463 | 607 | 527 | 568 | 551 | 536 | 26 | 12,895 | + 448 |
| Isle of Thanet ... ... . | 1,745 | 1,553 | 1,352 | 980 | 710 | 1,988 | 1,593 | 1,514 | 1,076 | 981 | 51½ | 36,637 | + 2,095 |
| Kilmarnock Corporation ... .. | 165 | 166 | 150 | 167 | 168 | 205 | 169 | 168 | 177 | 171 | 19 | 3,532 | + 252 |
| Lanarkshire ... ... .. | 1,636 | 1,794 | 1,563 | 1,736 | 1,682 | 1,800 | 1,839 | 1,815 | 1,673 | 1,835 | 38 | 64,124 | + 7,587 |
| Lancashire United ... .. | 1,399 | 1,542 | 1,427 | 1,470 | 1,484 | 1,570 | 1,879 | 1,808 | 1,736 | 1,662 | 38 | 58,924 | + 6,586 |
| Leeds City ... ... .. | 7,592 | 7,909 | 7,762 | 8,061 | 7,883 | 8,285 | 8,196 | 8,534 | 8,605 | 8,566 | 26 | 217,150 | + 14,428 |
| Leicester Corporation ... .. | 2,699 | 2,541 | 2,489 | 2,614 | 2,701 | 2,876 | 2,835 | 2,844 | 2,828 | 3,136 | 39 | 108,821 | + 10,206 |
| Leith Corporation... ... .. | 718 | 680 | 636 | 715 | 669 | 737 | 728 | 705 | 706 | 767 | 19 | 14,736 | + 498 |
| Liverpool Corporation ... .. | 12,003 | 12,328 | 11,672 | 12,198 | 12,015 | 13,102 | 13,170 | 13,291 | 12,924 | 13,554 | 38½ | 499,760 | + 37,801 |
| Llandudno and Colwyn Bay .. | 686 | 770 | 613 | 444 | 373 | 768 | 804 | 681 | 515 | 374 | 43 | 15,925 | + 1,369 |
| London County Council ... .. | 40,131 | 40,245 | 40,140 | 40,018 | 40,429 | 40,289 | 40,341 | 41,866 | 42,339 | 43,208 | 25 | 1,062,273 | - 14,114 |
| London General Omnibus... .. | 55,941 | 57,424 | 57,644 | 60,047 | 60,145 | 62,347 | 54,401 | 64,592 | 62,763 | 67,089 | 39 | 2,423,233 | +468,035 |
| London United ... ... .. | 6,445 | 6,494 | 6,270 | 6,316 | 6,399 | 7,045 | 6,090 | 6,758 | 6,707 | 6,926 | 39 | 247,096 | + 2,462 |
| Lowestoft Corporation ... .. | 452 | 345 | 276 | 239 | 210 | 517 | 403 | 336 | 280 | 243 | 51 | 11,269 | + 540 |
| Maidstone Corporation ... .. | 200 | 208 | 212 | 218 | 226 | 223 | 206 | 218 | 231 | 226 | 26 | 5,484 | + 274 |
| Manchester Corporation ... .. | 16,402 | 17,244 | 16,211 | 16,983 | 17,211 | 17,214 | 17,968 | 17,787 | 17,227 | 18,871 | 26 | 458,617 | + 23,192 |
| Metro. Electric Tramways .. | 8,838 | 9,594 | 8,778 | 8,824 | 8,967 | 9,060 | 8,985 | 9,530 | 9,468 | 9,738 | 39 | 351,980 | + 9,836 |
| Nelson Corporation ... .. | 197 | 224 | 202 | 208 | 217 | 237 | 214 | 251 | 189 | 238 | 26 | 5,649 | + 335 |
| Newcastle-on-Tyne Corporation .. | 4,203 | 4,451 | 4,247 | 4,438 | 4,388 | 4,812 | 4,768 | 4,862 | 4,883 | 5,158 | 26 | 125,051 | + 11,202 |
| Newport (Mon.) Corporation .. | 734 | 743 | 701 | 721 | 700 | 829 | 820 | 802 | 804 | 817 | 26 | 20,034 | + 1,533 |
| New St. Helens and District .. | 780 | 826 | 762 | 768 | 783 | 838 | 935 | 890 | 828 | 816 | 13 | 11,579 | + 1,362 |
| Northampton Corporation... .. | 550 | 532 | 515 | 547 | 520 | 595 | 626 | 579 | 596 | 799 | 26 | 15,409 | + 990 |
| Nottingham Corporation ... .. | 3,254 | 3,128 | 3,014 | 3,138 | 3,115 | 3,296 | 3,354 | 3,311 | 3,395 | 3,407 | 25½ | 85,339 | + 3,430 |
| Oldham Corporation ... .. | 1,982 | 1,764 | 2,077 | 2,099 | 2,017 | 2,508 | 1,982 | 2,204 | 2,217 | 2,401 | 27 | 59,855 | + 3,839 |
| Portsmouth Corporation ... .. | 2,595 | 2,515 | 2,282 | 2,288 | 1,964 | 2,968 | 2,628 | 2,818 | 2,440 | 2,478 | 26 | 64,088 | + 3,439 |
| Preston Corporation ... .. | 804 | 899 | 810 | 791 | 811 | 852 | 931 | 863 | 849 | 847 | 26 | 23,178 | + 1,224 |
| Provincial... ... .. | 2,279 | 2,278 | 2,067 | 2,047 | 1,877 | 2,654 | 2,392 | 2,425 | 2,187 | 2,137 | 52 | 100,189 | + 6,874 |
| Reading Corporation ... .. | 684 | 673 | 635 | 658 | 622 | 743 | 740 | 746 | 690 | 741 | 25½ | 18,051 | + 1,211 |
| Rochdale Corporation ... .. | 1,584 | 1,608 | 1,496 | 1,587 | 1,537 | 1,691 | 1,760 | 1,680 | 1,562 | 1,666 | 26 | 42,534 | + 1,592 |
| Rotherham Corporation ... .. | 770 | 765 | 795 | 750 | 752 | 1,016 | 1,027 | 1,038 | 1,015 | 1,062 | 26 | 26,244 | + 6,857 |
| Salford Corporation ... .. | 4,983 | 5,181 | 4,951 | 5,066 | 4,967 | 5,268 | 5,604 | 5,201 | 5,159 | 5,529 | 26 | 137,554 | + 5,325 |
| Sheffield Corporation ... .. | 6,697 | 6,684 | 6,765 | 6,833 | 6,776 | 7,192 | 7,234 | 7,270 | 7,357 | 7,585 | 27 | 195,637 | + 17,596 |
| Southampton Corporation... .. | 1,423 | 1,410 | 1,312 | 1,353 | 1,239 | 1,516 | 1,490 | 1,462 | 1,451 | 1,489 | 25 | 35,022 | + 1,716 |
| Southend-on-Sea Corporation .. | 1,178 | 1,116 | 1,000 | 966 | 847 | 1,673 | 1,436 | 1,292 | 1,257 | 1,086 | 26 | 28,120 | + 4,439 |
| South Metro. Tramways ... .. | 867 | 896 | 850 | 887 | 865 | 1,166 | 1,007 | 1,178 | 1,200 | 1,266 | 39 | 35,154 | + 1,907 |
| South Shields Corporation .. | 669 | 654 | 642 | 685 | 643 | 829 | 729 | 751 | 701 | 749 | 26 | 19,291 | + 2,547 |
| Sunderland Corporation ... .. | 1,403 | 1,295 | 1,341 | 1,369 | 1,252 | 1,586 | 1,568 | 1,426 | 1,475 | 1,559 | 26 | 38,849 | + 4,387 |
| Swindon Corporation ... ... | 179 | 170 | 166 | 168 | 171 | 192 | 178 | 181 | 172 | 183 | 25 | 4,329 | + 305 |
| Tramways (M.E.T.) Omnibus Co. ... | ... | ... | ... | ... | ... | 8,613 | 7,395 | 9,140 | 8,928 | 9,681 | 35 | 162,143 | — |
| Tyneside Tramways and Tramroads | 481 | 512 | 473 | 552 | 512 | 595 | 534 | 543 | 513 | 517 | 13 | 6,931 | + 479 |
| Wallasey Corporation ... .. | 1,275 | 1,186 | 1,082 | 1,121 | 1,075 | 1,373 | 1,335 | 1,293 | 1,186 | 1,236 | 26 | 33,400 | + 3,040 |
| Walsall Corporation ... .. | 599 | 577 | 580 | 604 | 591 | 688 | 608 | 629 | 627 | 663 | 39 | 24,161 | + 1,678 |
| Walthamstow U.D. Council .. | 720 | 711 | 676 | 681 | 670 | 789 | 717 | 802 | 744 | 792 | 26 | 19,993 | + 15 |
| Warrington Corporation ... .. | 431 | 444 | 429 | 428 | 424 | 428 | 432 | 435 | 437 | 454 | 26 | 11,407 | + 364 |
| West Ham Corporation ... .. | 2,625 | 2,630 | 2,521 | 2,591 | 2,579 | 2,691 | 2,638 | 2,718 | 2,701 | 2,783 | 25½ | 70,090 | + 1,968 |
| Wigan Corporation ... .. | 1,333 | 1,374 | 1,324 | 1,369 | 1,364 | 1,460 | 1,496 | 1,513 | 1,461 | 1,559 | 25½ | 37,830 | + 3,960 |
| Wolverhampton Corporation .. | 1,018 | 978 | 1,022 | 1,003 | 1,071 | 1,101 | 1,049 | 1,074 | 1,072 | 1,188 | 27 | 29,083 | + 1,679 |
| Yorkshire (West Riding) ... .. | 1,362 | 1,331 | 1,364 | 1,394 | 1,367 | 1,508 | 1,416 | 1,468 | 1,465 | 1,653 | 39 | 56,687 | + 6,193 |

## Electric Railways.

| NAME OF COMPANY. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central London ... ... ... | 4,421 | 4,474 | 4,777 | 4,733 | 4,954 | 3,631 | 4,296 | 4,039 | 4,433 | 4,408 | 39 | 187,299 | + 9,048 |
| City and South London ... ... | 2,811 | 2,722 | 2,885 | 2,738 | 2,901 | 2,464 | 2,650 | 2,644 | 2,607 | 2,647 | 39 | 108,511 | - 10,135 |
| Liverpool Overhead ... ... | 1,629 | 1,682 | 1,604 | 1,633 | 1,619 | 1,749 | 1,761 | 1,732 | 1,730 | 1,721 | 39 | 67,078 | + 5,190 |
| London Electric ... ... ... | 11,500 | 11,665 | 12,340 | 12,435 | 13,140 | 10,505 | 12,055 | 11,970 | 12,895 | 12,645 | 39 | 527,440 | + 3,780 |
| Mersey ... ... ... ... | 2,051 | 2,182 | 2,285 | 2,278 | 2,410 | 2,082 | 2,206 | 2,234 | 2,320 | 2,429 | 39 | 86,982 | + 5,018 |
| Metropolitan ... ... ... | 15,803 | 16,310 | 16,699 | 16,552 | 16,809 | 15,358 | 17,556 | 17,678 | 17,942 | 17,855 | 39 | 665,427 | + 17,816 |
| Metropolitan District ... ... | 11,083 | 11,787 | 12,299 | 12,250 | 12,595 | 10,841 | 12,180 | 12,162 | 12,687 | 12,433 | 39 | 502,859 | + 18,457 |

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### TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

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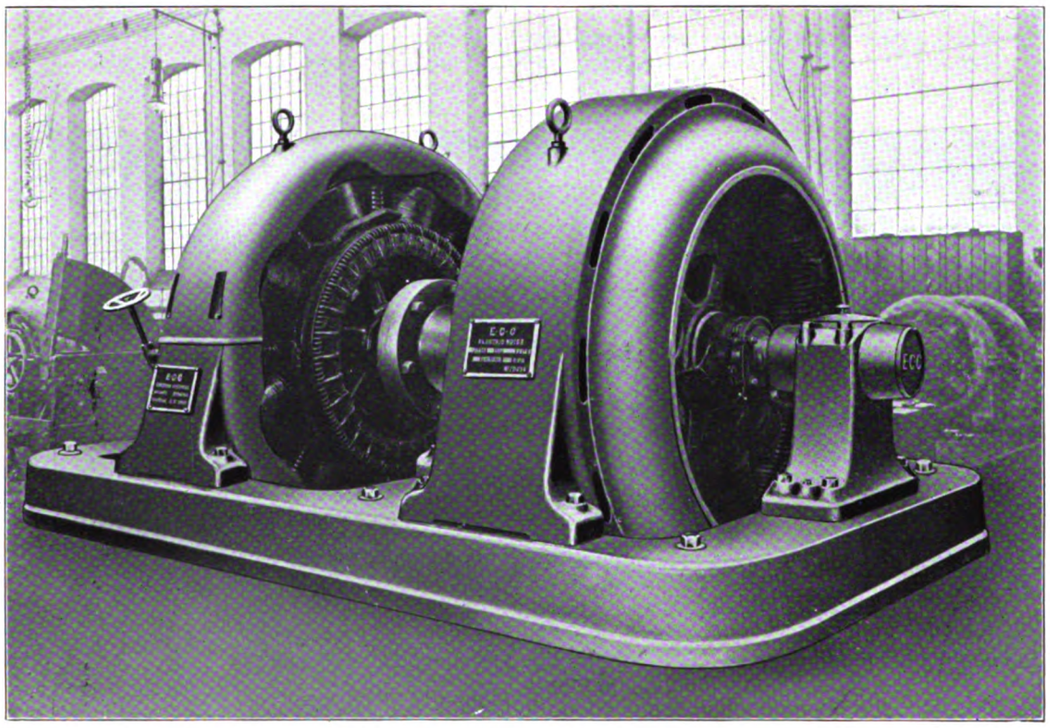
# E.C.C.

## ELECTRICAL PLANT

AND

## SWITCHGEAR

OF EVERY DESCRIPTION.



600 KW. SYNCHRONOUS MOTOR-GENERATOR.

THE

## ELECTRIC CONSTRUCTION CO., LTD.

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TELEGRAMS—"Concordance," London.

ADDRESS—
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9, NEW BROAD STREET,

**LONDON.**

WORKS:

TELEPHONES—75 and 430 Wolverhampton.
TELEGRAMS—"Electric," Wolverhampton.

ADDRESS—
BUSHBURY,

**WOLVERHAMPTON.**

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# BERNA

## COMMERCIAL MOTORS

ARE DESIGNED FOR HARD WORK,

**RELIABILITY**

IS THEIR OUTSTANDING FEATURE.

PART OF AN ORDER FOR TEN

**5-Ton Lorries.**

*THIS FLEET IS NOW AT WORK*

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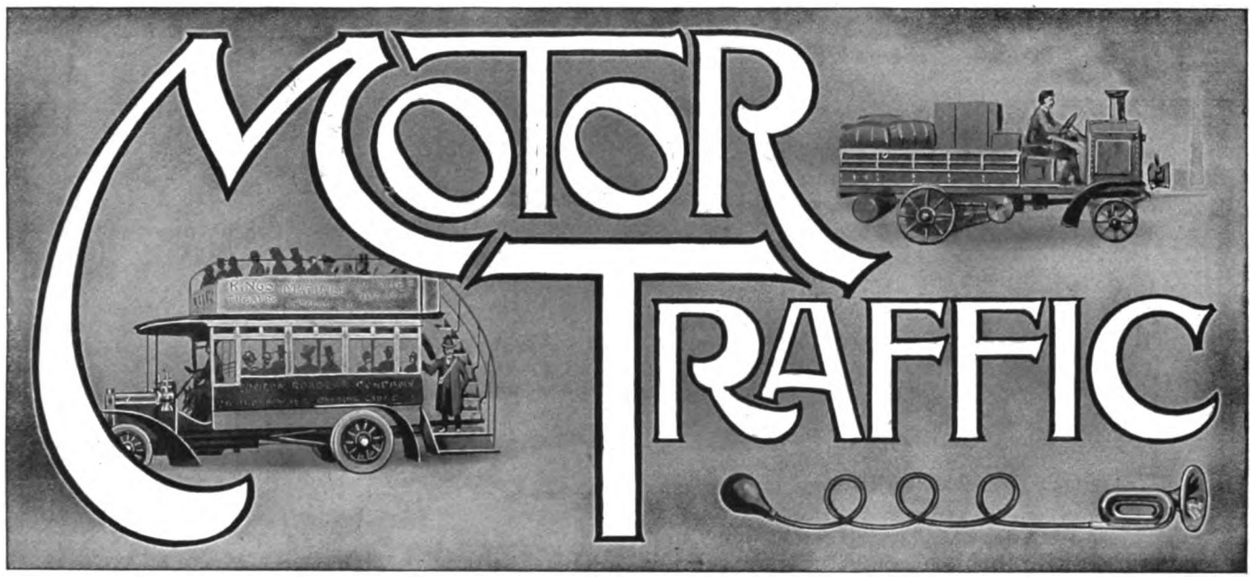


Now that the Development Commissioners have been more than three years in office and have made no progress with one of the most important enterprises for which the Commission was established—the improvement of rural transport—the suggestion might be put forward that that portion of their task should be allotted to the Light Railway Commissioners, whose powers should be widened so as to include railless mechanical road vehicles. The blame for the three fruitless years rests upon the Chancellor of the Exchequer. Although when he introduced the Development and Road Improvement Act, 1909, Mr. Lloyd George was profuse in acknowledging the need for improved means of rural transport, he imposed a restriction that has prevented any progress being made. The Commissioners admit that much, not only in regard to transport but to afforestation, land drainage and reclamation, and the improvement of inland navigation. The fatal blemish is that no advances can be legally made to individuals or companies trading for profit. This obstacle, however, may not in some quarters be deemed a sufficient excuse for the Commissioners allowing their third year of office to arrive before taking steps to examine one of the main questions in relation to transport, namely, the relative merits of light railways and the various forms of motor transport by road. During the past year only three applications were received, one relating to the establishment of a motor car service and two for light railways. Before giving their decisions on the applications the Commissioners appointed Mr. G. A. Burls, an engineer familiar with commercial motor transport, and formerly of J. I Thornycroft, Limited, to report in a specific case on the relative merits, particularly from a financial point of view, of light railways and motor transport, but his report had not been received by the end of the year. It is improbable that the contents will be made public, though its importance is enhanced by the statement in the Commissioners' report that they have reason to think that important schemes are likely to be brought forward shortly. This statement no doubt has reference to the steps that have been taken in Aberdeenshire, Banff, and Kincardine to form a Development Association in order to meet the defect in the Act and to promote light railways with the aid of one of the principal railway companies.

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In their present report the Development Commissioners urge that the difficulty might be to some extent overcome by the formation of national associations (not trading for profit) to receive and administer advances from the fund. Furthermore, they feel that the position ought not to be left unaltered without an effort to change it. Perhaps the best and most speedy remedy would be for the Government to hand over the transport work to the authority who are acquainted with the light railway side of it, and also to amend the Act in the direction of allowing grants to be made to companies already in existence or which might be formed. The amount of the grants allotted to the Commissioners for five years appears to be £2,900,000, and up to March 31 last the sum of £725,988 had been advanced to enterprises other than transport schemes. With a reasonable amendment of the Act, there ought to be no more illegality in assisting company projects than is the case when local authorities agree to pay an annual sum to another authority or company for an extension of tramways to their districts, or to recoup a loss on the working. The latest example of this is to be seen in the recommendation of the Finance Committee of Kidderminster Town Council, to make good any deficiency up to £200 on a motor omnibus service, proposed to be instituted at a cost of £4,000 by the Kidderminster and Stourport Tramways Company, for one year between the former town and Bewdley. There are to be cheap fares for workpeople, and the Council are not to grant facilities to anyone else in respect to a service of motor omnibuses in the borough. Various points were raised when the matter was discussed by the Council, and these are to be reported upon by the Committee. Probably the failure two years ago of five Irish Councils to secure aid from the Development Board for the establishment of motor services and for improving light railways built under the Tramways (Ireland) Act, 1883, was responsible for only three applications having since been received from local authorities in Great Britain. Before making loans the Development Board require a local contribution to be forthcoming of a reasonable proportion of the capital sum required, and full provision must be made for putting in order (where necessary) and for maintaining the roads upon which the motor service is to be run. This latter requirement should not be difficult to satisfy in view of the aid that ought to be forthcoming from the Road Board. Provided that battery vehicles can be run as cheaply as petrol machines, the advisability of directing attention to the Development Commission's powers might be considered by the Electric Vehicle Committee recently formed by the Municipal Electrical Association.

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# MOTOR TRAFFIC.

Commendation is due to the Army Council for making a new departure by advertising the institution of the subsidies of £110 to owners of petrol motor vehicles carrying 3-ton and 30-cwt. loads exclusive of heavy bodies, provided their prototypes have passed the official trials. The adoption of this method of publicity has been urged for some time, not only in the interest of the nation but of those manufacturers who have constructed such vehicles and passed the tests, in which the chassis has borne loads of 4 tons 10 cwts. and 2 tons 10 cwts. respectively. In return for the subsidy the owners contract to place their machines at the disposal of the Army in case of a national emergency, but not on the occasions of manœuvres. For the latter work a scheme of registration is in force under which a miscellaneous collection of wagons and lorries is utilised with their drivers. Under the subsidy scheme practically any type of body allowing of end loading is accepted, and a commendable feature of the advertisement announcing the subsidy is an invitation to owners to write and explain their difficulties in order to see if they can be met in the event of the subsidy type conveyances not appearing to meet their requirements. By this means it is possible that the scheme will be made to fulfil its purpose more thoroughly than would otherwise be the case. If, instead of announcing that a list of makers who have obtained the subsidy certificate can be supplied on application, the War Office were to advertise the names and addresses of those firms the department would be doing no more than justice to the manufacturers, for they have incurred considerable expense to produce vehicles suited to military requirements, besides the cost of trials extending over 21 days. To make good the foregoing shortcoming on the part of the Mechanical Transport Committee at Whitehall, we may mention that the first makers to pass the trials were Leyland Motors, Limited, whose success was achieved about a year ago. In the first month of the current year J. and E. Hall, Limited, and J. I. Thornycroft and Company, Limited, were added to the list. How much more advantageous motor traction proves compared to horses or heavy traction engines is shown by the average speeds in the trials on hilly and heavy roads exceeding 10 miles an hour, the highest average speed recorded being 12 miles per hour on main roads in a heavy condition, while the fuel consumption was considered to be as good as the standard specified.

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For the third series of trials, which are taking place this month, and also in November, the entrants are more numerous than on previous occasions, thus showing that the small entries received hitherto have not been due to anything fundamentally objectionable in the regulations. The new aspirants are Clayton and Company, Limited, Dennis Brothers, Limited, Maudslay Motor Company, Limited, Walker Brothers, Limited, and the Wolseley Tool and Motor Car Company, Limited, their vehicles all being of the 3-ton class, but the Wolseley Company will also run a 30-cwt. chassis. The Lacre Motor Car Company have entered an engine made by W. H. Dorman and Company in order to test its suitability for use in subsidised vehicles. That the scheme is increasingly claiming the attention it deserves is shown by the announcement that the War Office have passed the designs for a number of other vehicles, which cannot be completed in time for the present trials, and that the fourth series of trials will be arranged for the spring of next year. That the subvention type of vehicle is suited for civil work in this country as well as for the Colonies was made evident by the examples staged at the recent exhibition at Olympia, but in view of the suggestions put forward in the course of the papers submitted to the Imperial Motor Transport Conference, the War Office might now consider if their specifications cannot be improved, either by instituting a class for chain-driven vehicles or by adopting some of the pointed suggestions put forward by Mr. Hamilton Grapes, an engineer whose public service and commercial motor vehicle work for ten years in Australia should enable him to speak with some authority regarding the design of vehicles, whether for commerce or military work overseas. It is mainly in countries other than Great Britain that the type will be required for service with an expeditionary force. As the result of the experience gained at this year's army manœuvres it will not be surprising if the authorities give consideration to the question of supplanting some of the horsed regimental transport and cooks' carts with motor vehicles. This year's operations proved so severe a test that the horsed transport did not perform its portion of the work of taking supplies to 40,000 men and 13,000 horses altogether satisfactorily, after receiving them from the hired motor transport, which brought the food for distances of 40 miles and upwards from the rail head. By a system of grouping regimental units it should be possible to keep motor vehicles fully employed all the year round, and if provision were made for the proper training of Army Service Corps officers and regimental quartermasters in the maintenance of motor vehicles, there would be a better guarantee that the new equipment would be intelligently and carefully handled. At present the War Office, on account of financial considerations, is proceeding very cautiously in providing motors for the A.S.C., but the increasing dearth of horses which is experienced each year, combined with the experience gained at the manœuvres, may lead to an announcement of great interest to commercial motor vehicle makers when the Army estimates are introduced next year.

## STOPPING PLACES OF CARS AND 'BUSES.

### An Admirable Arrangement in West Ham.

Representatives of the West Ham Corporation Tramways Committee, and of the London General Omnibus Company, have met and agreed to a list of places at which the tramcars and omnibuses shall respectively stop, thus doing away with the danger to the public which exists while the two classes of vehicle use the same stopping places. Acting upon this agreement between the two parties, Sir E. Henry has decided to embody the arrangement into regulations to be observed by all tramcars and omnibuses running through West Ham.

### Agreed By-Laws for Glasgow.

In consequence of complaints made against motorists in Glasgow of endangering persons entering and leaving tramcars, a conference has been held between the Magistrates' Committee of the Corporation and representatives of the Scottish Automobile Club. As the result two by-laws have been agreed to, subject to the approval of the Corporation and confirmation by the sheriff, under which every driver of a vehicle when passing a tramcar proceeding in the same direction is to pass on the left or near side, except in cases of sufficient reason for deviation. When a tramcar is standing at a stopping-place, every driver of a vehicle who intends to pass on the left or near side of such car is to draw up immediately before arriving at such stopping-place, until the roadway is clear of passengers entering or leaving a car.

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# MOTOR TRAFFIC.

## AVELING WEATHER SCREENS.

The three illustrations on this page show the Aveling patent weather screen in use, both open and closed, on a Daimler omnibus belonging to the Birmingham Corporation Tramways department, and on an

Aveling Weather Screen Fitted to L. & N. W. 'Bus.

omnibus belonging to the London and North Western Railway Company. As the result of a trial of the invention, Mr. Alfred Baker, the general manager, has given an order for the supply of similar

Aveling Weather Screen—Open.

Aveling Weather Screen—Closed.

screens for the whole of the omnibuses of the Corporation. The makers are Messrs. T. C. Aveling and Company, Limited, New Canal Street, Birmingham.

## "THE UNOFFENDING OMNIBUS."

London Coroner's Suggestion for Preventing Accidents.

Mr. S. I. Oddie, coroner for Westminster, has put forward a suggestion for preventing accidents caused by motor omnibuses in the city of Westminster, which extends roughly from the Thames on the south to Oxford Street in the north, and from Kensington Palace in the west to Chancery Lane in the east. Here are to be found most of the taxi cabs, the large motor cars, and the motor omnibuses. Here also are the crowds of shoppers, the theatre goers, and the country and foreign visitors, but there are practically no tramcars.

"As coroner for Westminster," Mr. Oddie says, "my experience of fatal accidents in this area has led me to the conclusion that a considerable saving of life might be effected in a very simple manner. A common cause of fatal accidents is to be found in the overtaking of one swift vehicle by another at crossings provided at dangerous points for the safety of foot passengers. Take the case of a pedestrian who leaves the pavement at such a place to cross to a refuge in front of an advancing motor omnibus. He would be perfectly safe from the omnibus, but he finds, when he has crossed in front of it, that a taxi cab or motor car is overtaking the 'bus on its off side. He is now in a perilous position. He has no time to go forward and reach the refuge, and perforce he steps back to avoid the taxi cab and is knocked down by the unoffending omnibus.

"If a certain number of the principal crossings and refuges were marked by a distinctive sign or colour, and if no overtaking of one vehicle by another were allowed at such crossings, I feel confident that many lives would thereby be saved. Another suggestion that occurs to me is that at certain bewildering crossings, such as Trafalgar Square, there should be a refuge between all lines of traffic proceeding in opposite directions. The effect of this would be that the pedestrian, as he passes between pavement and refuge, or refuge and refuge, would only have to look out for and to deal with one line of traffic at a time."

## RAILLESS TROLLEY CAR v. MOTOR 'BUS.

Before putting into operation the powers which they acquired last year to install a railless trolley car system and to run motor omnibuses, the Hove Town Council have decided to acquire the fullest information regarding the two methods of traction. For this purpose two members of the Corporation and Mr. H. H. Scott, borough engineer, have visited various railless trolley installations in England and also received reports from experts in motor omnibus traction. In his report Mr. Scott points out the difficulty of instituting a reliable comparison between the cost of working the two kinds of 'buses, as local conditions play an important part in the calculation. He is inclined to take the operating cost of trolley 'buses at 7d. per mile, and for motor 'buses as applicable to Hove at 9d. per mile. In speed the vehicles were about equal, and the wear in roads might be the same in each, but the trolley 'bus would run in the same groove. The motor 'bus would not be rated, except on the assessment for the buildings and garage connected with the undertaking. In this respect it differs from the trolley 'bus, which, he assumes, would be assessed on similar methods to tramways—*i.e.*, on its revenue-earning capacity. In considering the 2d. per mile extra cost of the motor vehicle, it must be remembered that charges for interest and sinking fund would be lower by reason of the absence of capital expenditure upon overhead equipment, which might make a difference of from 0·25d. to 0 5d. per car-mile, according to the number of vehicles in the service. Taking the 2d. as a basis of calculation, it is estimated that on a fleet of 25 'buses running an average of 100 miles per day during 300 days of the year, the cost would be an extra £6,250 per annum for motor 'buses as compared with trolley vehicles. Notwithstanding the difference in cost of running in favour of the trolley vehicle, he suggests for consideration whether in the event of the Town Council deciding to proceed with the matter at once, it would not be wise to limit the erection of overhead wires to the routes set out in Clause 16 of the Hove Corporation Act, 1912, leaving the other routes named in the Act to be dealt with as experience may determine.

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# MOTOR TRAFFIC.

## INTERNAL COMBUSTION ENGINES APPLIED TO RAILWAYS.

In a paper on the above subject before the Engineering Section of the British Association meeting on September 12, Mr. F. W. Lanchester discussed various systems by which the internal combustion engine was applied to railway traction, and by process of elimination the author deduced that for the conditions of British railways, at least, the most promising solution was found in a straightforward piece of engineering, in which all the main elements, the petrol motor, the gear box, the jointed transmission shaft, and the right-angle drive, also the auxiliary electrical equipment, were taken *mutatis mutandis* from motor car practice. The paper described a recent development of the self-propelled railway coach in the form of a vehicle built by the Metropolitan Wagon Company and equipped with its power installation by the Daimler Company. The general lines of the coach—a 60 ft. bogie—were described, and the installation was given as being furnished in duplicate, each power unit comprising a 6-cylinder sleeve-valve Daimler engine of 6 in. bore and 6 in. stroke, a triple-tandem 6-speed epicyclic gear box, in which the speeds are grouped as three low-gear ratios, whose function is mainly in starting and giving high acceleration, and three high-gear ratios, which are exclusively used for running at speed. The whole of the gears are actuated by clutches of the magnetic type. The right-angle transmission is fitted to a prolongation of one of the bogie axles, and consists of a bevel drive, in which the pinion on the tail shaft gears simultaneously into two crown wheels on the axle, an alternative dog clutch being arranged to bring one or the other into positive connection. By this means the reversal of the car is effected. The two units are disposed symmetrically on opposite sides of the vehicle, and drive on to opposite ends, so that the job is entirely symmetrical. The vehicle can be controlled from either end. The electrical equipment consists of dynamos coupled direct to the tail ends of the respective engine crank shafts and an accumulator battery, and serves both for starting the engines and for lighting purposes and driving an electric air compressor to operate the air brake.

In a brief discussion, Professor H. S. Hele-Shaw described his system of hydraulic transmission, which has been applied to a motor coach now in operation in America, and suggested that the future developments upon the lines indicated by Mr. Lanchester would lie between these two systems.

## INSTITUTION OF AUTOMOBILE ENGINEERS.

The new session commenced on October 8, when Mr. J. S. Critchley gave his presidential address, in which he dealt broadly with the whole subject of fuel for internal combustion engines. The presentation of the Crompton Medal of the Institution was made to each of the past presidents, by the retiring president.

The ordinary monthly meetings will be held as usual at the Institution of Mechanical Engineers, on the following dates: November 12, December 10, January 14, 1914, February 11, March 11, April 8, May 13, and among the authors will be: Dr. W. R. Ormandy, Mr. A. Ludlow Clayden, Mr. A. E. Bennett, Prof. J. Goodman, Mr. F. W. Lanchester, Mr. H. E. Wimperis, and Dr. E. G. Acheson. It is probable that the subjects to be dealt with will include the following: Results of Tests on Alcohol, The Economics of Design, Balancing, Commercial Vehicles, Lubrication, Ignition Magnetos, Accelerometer Tests, and a lecture on Bearings. Mr. Basil H. Joy, the secretary, informs us that a register is kept at the Institution of members who are seeking employment, and enquiries for those who are seeking for men to fill vacancies will be welcomed.

It is hoped that a paper will be read at the November meeting of the Institution embodying the result of the observations of the various members of the party who visited America this summer, and it is expected that a number of members of the American Society of Automobile Engineers, who will be in London on a visit to the Motor Show, will be present at that meeting to take part in the discussion. It is also hoped that as a result of the interchange of ideas a number of members of the S.A.E. will join this Institution also.

The Birmingham and Coventry Branches of the Institution have now been definitely amalgamated under the title of the Midland Centre.

NEW USE FOR MOTOR OMNIBUSES.—During the recent army manœuvres in France a number of motor omnibuses were utilised as meat vans. The windows and door were removed and wire gauze substituted. The seats were also taken out and meat hooks were affixed to the roof.

## LECTURES TO COMMERCIAL MOTOR DRIVERS.

With a view to giving drivers of commercial motor vehicles an opportunity of improving their knowledge of the construction and working of commercial motors, the Commercial Motor Users' Association has made arrangements for Mr. G. W. Watson to deliver a series of lectures to drivers in the employ of members. The lectures will be given at the Royal Automobile Club, Pall Mall, London, S.W., from 8 to 9 p.m., on alternate Wednesdays in the months of October, November, December, and January, and commenced on October 8. In order to prevent overcrowding of the lecture hall, a registration fee of 1/- per driver is being charged. Application for lecture membership should be made to Mr. F. G. Bristow, secretary, 89, Pall Mall.

## AN ALBION MOTOR TOWER WAGON.

Subjoined is an illustration of a motor tower wagon recently supplied to the Doncaster Corporation tramways department by the Albion Motor Car Company, Limited, Scotstoun, Glasgow. The engines

develop 32 H.P., and as the chassis is designed for only two tons, the vehicle in an emergency can be driven to the place where it is required at a speed as high as is reasonable with solid rubber tyres.

## PARAFFIN FUEL FOR COMMERCIAL VEHICLES.

Mention was made at the first annual meeting of the G.C. Vaporiser, held at Winchester House, London, E.C., by Mr. N. O. Walker, the chairman, that although there were other carburettors on the market, he believed that there were none doing the work so well as the G.C. vaporiser, and, indeed, if there were one or two other successful vaporisers or carburettors, instead of injuring this company, it would, in his opinion, help it, because it would show that the public were getting over their prejudice. In a War Office trial for lorries using paraffin their vaporiser was the only one submitted for trial, though others were entered. This vehicle ran on any paraffin the War Office choose to supply, and at the end of the trial Messrs. Pickford, whose van was used, were informed that the War Office were agreeable for the subsidised vehicles to be fitted with this device.

COVENTRY'S PURCHASE OF OMNIBUSES.—Coventry Corporation, on the advice of the Tramways Committee, have purchased six motor omnibuses at a cost of £4,434 from the Maudslay Motor Company, Coventry.

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# MOTOR TRAFFIC.

## WAR OFFICE SUBSIDY TRIALS.

The fourth trial of petrol lorries under the War Office subsidy scheme is now in progress, the entrants being Clayton and Company, Limited; Dennis Brothers (1913), Limited; Maudslay Motor Company, Limited; Walker Brothers, Limited; and the Wolseley Tool and Motor Car Company, Limited. Their vehicles are of the 3-ton type, and the Wolseley Company have also entered a 30-cwt. vehicle. The Lacre Motor Car Company, Limited, have submitted a Dorman engine, as manufactured by W. H. Dorman and Company, Limited. The preliminary examination of vehicles on the road and in the neighbourhood of the entrants' works commenced on September 15, and between that date and October 8 runs at the rate of 200 miles per week took place in the neighbourhood of the entrants' works, though not under War Department observation. On October 8 the vehicles were presented for examination and weighing at the Army Service Corps training establishment at Aldershot. During 21 days in October and November the vehicles are being tested on five main and two hilly routes at Aldershot, and four main and seven hilly routes at Woolwich. The route between the two places named will be traversed twice, and the last running day on November 3 is set aside for a Brooklands speed trial or a 100 miles run over a special route. Finally, the machines will be examined as to their condition.

As a result of the trials of subsidy type vehicles, held in January last over roads in southern counties, the War Department certificate, enabling vehicles built entirely to the same design to be subsidised under the provisions of the subsidy scheme for petrol-driven motor lorries, has been awarded to the following firms: J. and E. Hall, Limited, London and Dartford, and J. I. Thornycroft and Company, Limited, London and Basingstoke.

Owing to the weather and road conditions, the test was a severe one. Both of the certificated vehicles were entered in Class "A" to carry a load of 3 tons, exclusive of heavy body. The actual load carried on the chassis throughout the trial was in each case 4 tons 10 cwts. The certified chassis weights, with all fuel and water on board, and including lamps and acetylene generator, are: Hall, not exceeding 3 tons 2 cwts.; Thornycroft, not exceeding 2 tons 19 cwts.

Certificates for both Class "A" and Class "B" vehicles have already been granted to Leyland Motors, Limited, Leyland, as the result of previous trials. Appended is a table showing the averages of the daily results obtained by all competitors:

AVERAGE RESULTS OF ALL COMPETITORS.

| Date. | Route. | Class of Road. | Condition of Roads. | Average Speed. M.P.H. | Fuel Consumption. Gross Ton-miles per Gallon. |
|---|---|---|---|---|---|
| Jan. 10 | A | Main | Very fair | 11·5 | |
| „ 11 | D | „ | Heavy | 11·8 | 41·4 |
| „ 13 | E | Hilly | Very good | 11·8 | |
| „ 14 | J | „ | Fair | 11·3 | 43 |
| „ 15 | B | Main | „ | about 12 | |
| „ 16 | C | „ | Good | „ 12 | 49·1 |
| „ 17 | To Woolwich | Hilly | Very fair | 11·3 | |
| „ 18 | T | „ | Heavy | 10·5 | 40·5 |
| „ 20 | L & N | Main | Wet and heavy | 11·7 | |
| „ 21 | L & M | „ | Good | about 12 | 46·5 |
| „ 22 | U | Hilly | „ | 10·9 | |
| „ 23 | V | „ | Fair | 10·1 | 42·3 |
| „ 24 | L & O | Main | Very fair | about 12 | |
| „ 25 | P | „ | Heavy | „ 12 | 50 |
| „ 27 | U | Hilly | Good | 11·3 | |
| „ 28 | T | „ | Very fair | 10·9 | 43·7 |
| „ 29 | U | „ | Heavy | 10·9 | |
| „ 30 | V | „ | „ | 10·5 | 40·7 |
| „ 31 | To Aldershot | „ | Good | 11·2 | |
| Feb. 1 | D | Main | Heavy | about 12 | 43·2 |
| „ 3 | E | Hilly | „ | 10·2 | |
| „ 4 | J | „ | Very fair | 10·9 | 40·5 |

The fuel consumption was considered to be at least as good as the standard specified, namely, 50 g.t.m. per gallon under normal road conditions, when the heavy state of the roads is taken into consideration.

LOCAL AUTHORITIES AND ROAD MAINTENANCE.—The Executive Committee appointed at a recent conference at Guildhall of local and road authorities in the Metropolitan Police area on the subject of the motor omnibus traffic met again at the Mansion House on September 30. The Lord Mayor presided. It was decided to prepare statistics in regard to the contributions which, it was suggested, should be paid to the highway authorities by the Road Board to cover the cost of the reconstruction of roadways caused by the increased wear and tear and damage set up by the motor omnibuses. When these and other details have been collated, the Prime Minister will be invited to receive a deputation and hear the views of the authorities.

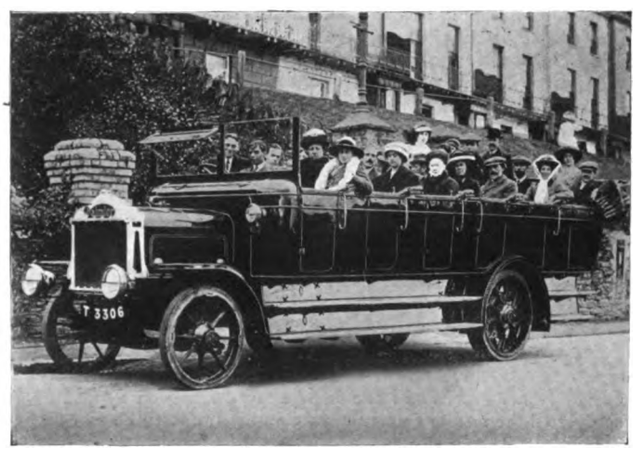
## OMNIBUSES FOR COLONIAL USE.

A report on the question of using motor omnibuses as feeders to the tramways has been presented to the Pretoria Council by the tramways manager. The cost of two vehicles, with spare parts, is put at £2,400, and with one on the road and one in reserve the total cost is given as £260 per month. The manager also considers that the motor omnibuses would be useful in testing routes suggested for tramway extensions. The Tramways Committee recommended the Council to purchase two vehicles.

Wellington (New Zealand) Council have authorised the Tramways Board to purchase three motor omnibuses as feeders to the tramways. The Board will present an estimate of the cost before purchasing the vehicles.

## DAIMLER TOURING CHARS-A-BANC.

The accompanying photograph shows the 40-H.P. Daimler chars-a-banc in use by Autocars, Ilfracombe, Limited, for touring purposes. Several long-distance journeys are made during each week, one being across Dartmoor—a tour of 157 miles through Torrington, Okehampton, Tavistock, Princetown, and Moreton Hampstead. Another is




from Ilfracombe to Bude in Cornwall, a distance of 112 miles. An average distance of 500 miles per week has been run, and the vehicle is giving the greatest satisfaction.

EFFECT OF TRAFFIC COMPETITION ON LONDON RATES.—At the last meeting of the London County Council before the summer recess, Mr. J. D. Gilbert asked the chairman of the Local Government Committee whether he could state (1) how many assessment appeals had been made against Borough Council valuations of tramway tracks for rating; (2) could he inform the Council if railway companies were also appealing against their local assessments on account of loss of revenue owing to motor 'bus competition; (3) would not the effect of the Council's and railway companies' appeals, if successful, be to increase considerably the rates of Borough Councils; (4) was it possible to give the Council any illustration of what any one Borough Council would lose over the reduction of tramway and railway rates, and what increase there would be owing to increased road charges? Mr. E. L. Meinhertzhagen (chairman of the committee) replied that no appeals had yet been lodged, but objections to the assessment of the Council's tramway lines had been served in 23 boroughs. He understood that at least one railway company was objecting to its assessments, on account of reduced revenue owing to motor 'bus and tramway competition. Any considerable reduction of assessment must necessarily result in an increase in the rates. The loss would not fall eventually wholly upon the borough in which the reduction took place, but would be shared partly by the whole of London. There was one case which he hoped had been settled with a certain Borough Council, though it was not finally settled. The reduction in that case would probably involve an increase in the rates of the first year of less than one-third of a penny in the pound, which would be reduced in subsequent years to about a farthing.

A PETROL TRAMCAR IN SCOTLAND.—The Lanarkshire Motor Company, of Glasgow, have fitted a tramcar with a petrol engine for the Stirling and Bridge of Allan Tramway Company.

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# MOTOR TRAFFIC.

## MOTOR TRAFFIC NOTES.

AN INQUIRY FROM GOLCAR.—The Urban Council of Golcar have decided to obtain particulars as to the cost of running single-deck omnibuses similar to those at Halifax.

LANCASTER COUNCIL'S ENTERPRISE.—Parliamentary powers are to be sought to enable the Council to provide and run motor omnibuses. Six vehicles are being purchased for £2,600.

FROM MANCHESTER TO CENTRAL CHESHIRE.—Motor vehicles are to take the place of the horse 'bus service between Cheadle and South Manchester, linking up Handforth, Wilmslow, Alderley, and Macclesfield.

LICENSING OF MOTOR OMNIBUSES.—The Gravesend and Northfield Electric Tramways, Limited, have been fined a nominal sum at the instance of the Dartford Urban Council, for plying for hire with two motor 'buses between Gravesend and Dartford without licences.

CREWE MUNICIPAL OMNIBUS SCHEME.—A sub-committee of the Crewe Town Council has been appointed to consider the matter of applying for powers to enable the Corporation to provide and own omnibuses. A draft of the proposed bill has been prepared by the Town Clerk.

LINCOLN'S REQUIREMENTS.—The Electricity Committee of the City Council have been in negotiation with two firms in regard to supplying motor 'buses in the city, but have failed to arrive at an arrangement. The chairman of the committee stated on October 7 that it was possible the Corporation might themselves establish a service.

QUESTION OF TRAMWAY EXTENSION AT DURBAN.—The Mayor of Durban, in referring to the deferred decision of the Council in regard to a proposed important extension of tramways, said that recent developments appeared to him to indicate that motor and electric 'buses would ere long supplant the tramcar equipment.

AN OXFORD PETITION FOR MOTOR OMNIBUSES.—Residents of Banbury Road have petitioned the Council against the proposal to adopt overhead tramways in that thoroughfare, and to substitute either motor omnibuses, which the Corporation have approved of for Woodstock Road, or petrol-driven tramcars, which have been selected for High Street.

MOTOR WAGON COMPETITION WITH CANALS.—Bearing in mind the competition of motor wagons the chairman of the Leeds and Liverpool Canal, in his remarks at the half-yearly meeting on September 19, considered the result of the past six months' traffic to be satisfactory. Taking a series of 10 consecutive half-years, the average receipts were slightly in excess of the past half-year.

MOTOR SPIRIT FROM PEAT.—It is claimed for a new invention known as the Del Monte process that Irish peat can be made to yield a high percentage of oil, the residue being a high-grade coke. Other by-products include sulphate of ammonia. It is stated that recent tests yielded an even average of 40 gallons of oil per ton of dry peat, the quality being so high that 20 gallons of motor spirit was obtainable from it.

RAILWAYS AND ROAD MOTOR WAGONS.—The Great Western Company have for some time past, in different parts of the country, been utilising and are still experimenting with various types of motors in the delivery and collection of traffic carried by goods train. The results are being examined carefully in order to ascertain the advantages derived over horse traction. Two 5-ton Maudslay cars are working between Paddington goods station and the London docks.

CROYDON COUNCIL DEMAND TRAFFIC LEGISLATION.—On September 22 Croydon Corporation passed a resolution urging the Government speedily to legislate upon the lines of the recommendations of the Select Committee on Motor Traffic, owing to the dangerous and congested state of the streets, the serious accidents and loss of life, through the influx of 'buses. It was stated that five persons have been killed in Croydon this year by these vehicles, but none by tramcars.

A POSSIBLE OPENING FOR OMNIBUSES.—A Weymouth newspaper has bewailed the fact that the winter is approaching, when "the intolerable nuisance of having to detrain at Melcombe Regis, and walk through storm and rain to Weymouth Station is necessitated" in order to reach Portland. The Great Western Railway Company have informed Portland Council that they cannot increase the facilities. The neglect of Easton, with its 7,000 inhabitants, is also lamented, and the Portland Council are urged to install a railless trolley car service.

ADVERTISING FOR TRAFFIC.—Timely and persistent advertising in the newspapers has apparently done much to increase the pleasure traffic of the London General Omnibus Company this summer. The pleasures of blackberry gathering, and of witnessing the harvesting were two of the subjects which have been utilised to attract attention to the Sunday travelling facilities. Nearly 30 special services are now in operation on Sundays. The parks and commons and the omnibus lines by which these may be reached on any day are dealt with in a handbill enclosed with the monthly map and guide.

THE MALAY STATES AND MOTOR VEHICLES.—Following on the revolution in China, and the adoption of European dress by the Chinese, the Federated Malay States, which are under British supervision, are showing increasing preference for Western comforts. In 1912 motor cars, cycles, and accessories were imported to the value of £184,254, as against £154,542 in 1911. American makers took advantage of the strikes in England to flood Malay with cheap and serviceable pleasure cars. The pre-eminence of the British public passenger car, if its claims are made known, should count for something in the awakening.

PROPOSED PURCHASE OF THE BIRMINGHAM OMNIBUS UNDERTAKING.—It is understood that the Tramways Committee have agreed to recommend the Corporation to purchase the Birmingham and District Motor Omnibus Company's rights in the city for £30,600, inclusive of 30 omnibuses, garage and works. The Corporation on September 30 decided to include in their Parliamentary bill for next session a clause to enable them to provide and run omnibuses. When this power is obtained the Corporation will have control of both forms of public passenger transport, and the 'buses will be used for developing new routes as well as for traffic in those central streets where the Council have refused to construct tramways owing to the congestion.

CHOICE BETWEEN RAILLESS TROLLEY CARS AND MOTOR OMNIBUSES.—The terms offered with a demonstration motor omnibus being considered prohibitive, York Tramways Committee recommended the City Council at their September meeting to apply for powers to run railless trolley cars along two routes to Heworth and Haxby Road, but the Council referred back the recommendation for further consideration.—The directors of Aberdeen Suburban Tramways Company have received authority from the shareholders to work trolley cars or other mechanically-propelled vehicles, and the chairman has stated that it would not be wise to say definitely what vehicles would be best. There was, he added, a strong feeling in favour of motor 'buses among the directors.

NORTHERN COMMERCIAL MOTOR USERS' ASSOCIATION.—Although only inaugurated at the end of June last, the Manchester, Liverpool, and Counties Commercial Motor Users' Association has reached a membership of 71. The organisation is affiliated with the London Association and the Royal Automobile Club. The officers have now been appointed. Mr. R. C. Reynolds, of the Bleachers' Association Limited, is the first chairman; Mr. Leo Swain (Messrs. Leo Swain and Company, and the Polack Tyre and Rubber Company, Limited) is the vice-chairman; Mr. John Faulkner (C. T. Faulkner and Company, Limited) is the hon. treasurer; and a representative committee have been elected. The secretary is Mr. Ellis Green, Cromwell Buildings, Blackfriars Street, Manchester.

MEA MAGNETO.—This magneto possesses many novel and important differences to any other on the market, and for ignition purposes on internal combustion engines is claimed to be the most satisfactory. In place of the usual horse-shoe magnet, the Mea is fitted with a bell-shaped magnet so arranged that it can be rotated with the contact breaker. The natural result of this design is that whether advanced or retarded an equally good spark is given. Also a good spark is given at quite low speeds. The first two cars (Peugeots) in the Grand Prix Motor Car Race were fitted with Mea magnetos. No other magneto, or system of ignition was fitted. This seems to indicate the confidence placed in the Mea magneto by the manufacturers of the Peugeot car. The Mea is sold in England by Mea Magneto Company, Limited, Gresse Buildings, Stephen Street, S.W.

FRENCH COMMERCIAL VEHICLES.—Presiding at the annual meeting of Delahaye and Company, Limited, at the Great Eastern Hotel, London, Mr. A. A. Campbell Swinton stated that the business in heavy vehicles for 1912 showed a large increase over that for the preceding year, and their sale of vehicles for public passenger services and for the conveyance of goods had also considerably augmented. Messrs. Hobson were now their agents in this country for commercial vehicles, and were at the present time supplying the War Office with a number of Delahaye travelling workshops and aviation lorries. The 170 postal vans, of which he spoke last year as being all simultaneously put into use in Paris at two o'clock on the morning of December 1, 1911, without any interruption of the regular service, had continued to give entire satisfaction to the company which was running them.

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THE

# Tramway & Railway World

Vol. XXXIV. No. 20. ] LONDON, SATURDAY, OCTOBER 18, 1913. [Established in 1892.

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**

**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

TENDERS FOR UNIFORM CLOTHING AND CAPS.

The Tramways Committee are prepared to receive tenders for the supply of Uniform Clothing and Caps for the Inspectors, Motormen, and Conductors.

Forms of tender may be had on application to the undersigned at the Tramway Offices, The Council House, Congreve Street, Birmingham. Tenders must be made on the form provided, and must be handed in not later than 12 o'clock noon on Monday, the 10th day of November, 1913.

The Committee do not bind themselves to accept the lowest or any tender.

Persons tendering must at the time of tendering and at all times during the execution of the works be paying all their workpeople not less than the standard rate of wages in the districts where such workpeople are actually engaged in the execution of the work, and must be observing the hours and conditions of labour recognised by the Associations of Employers and the local organised bodies of workers in the various trades in such districts. The contractor will be held responsible for the observance of these conditions by any sub-contractor employed by him.

The contractor must also agree to comply with and conform to the provisions of the Trade Boards Act, 1909.

ALFRED BAKER,
General Manager.

The Council House,
Congreve Street, Birmingham.

### THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

| | |
|---|---|
| Points and Crossings. | Brass Hinges, Handles, etc. |
| Cast Iron Chairs. | Wood Handles. |
| Cranked Fish-plates. | Fire-bricks and Clay. |
| Cast Iron Sluice Valves. | Metals. |
| Plumbago Crucibles. | Stationery, etc. |
| Platelayers' Tools. | Galvanised Corrugated Sheets etc. |
| Galvanised Wrought Iron Water-tubes, etc. | |

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in sealed envelopes, addressed to the undersigned, marked "Tender for Points and Crossings," or as the case may be, not later than 11 o'clock a.m. on Thursday, October 23, 1913.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.,
October 15, 1913.

### CORPORATION OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery, and erection at their Dickinson Street Generating Station, of

One Storage Battery, Battery Booster, and Switchboard.

Specifications, etc., may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a deposit fee of £2 2s., which amount will be refunded on receipt of a *bonâ-fide* tender.

Further particulars and information can be obtained from Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Wednesday, October 29, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
October 13, 1913.

### BURGH OF LEITH.

TRAMWAYS DEPARTMENT.

The Town Council invite tenders for the supply of a Motor Tower Waggon.

Copy specification and general conditions of contract may be obtained from the Tramways Manager, 165, Leith Walk.

Tenders, marked "Tower Waggon," must be lodged with me not later than 28th inst.

The lowest or any tender must not be necessarily accepted.

D. ROBERTSON.
Town Clerk.

Town Clerk's Office, Leith,
October 14, 1913.

### PORTSMOUTH CORPORATION TRAMWAYS.

CONTRACT.

The Tramways Committee invite tenders for the supply and delivery of Uniforms for Tramwaymen for two years. Specification and conditions, and form of tender, may be obtained, and sample garments may be seen, on application to the Office of the General Manager, Town Hall, Portsmouth.

Sealed tenders, endorsed "Tenders for Uniforms," to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 12 noon on Monday, November 10, 1913.

The Committee do not undertake to accept the lowest or any tender, and reserve the right to accept the whole or any portion of the tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth,
October 18, 1913.

### COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply and delivery of Five Car Trucks. Specification, general conditions, and form of tender may be obtained from the undersigned.

Sealed tenders, endorsed "Car Trucks," must be delivered to Higson Simpson, Esq., Town Clerk, West Hartlepool, not later than noon on Monday, October 27.

The Corporation do not bind themselves to accept the lowest or any tender.

CHAS. BURGESS,
General Manager.

Tramway Depôt,
Greenland, West Hartlepool,
October 14, 1913.

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## URBAN DISTRICT OF RATHMINES AND RATHGAR.

ELECTRICITY SUPPLY DEPARTMENT.

The Council invite tenders for the supply, delivery, and erection of :—

One 400 kw. Generating Set, consisting of a High-speed Steam Engine direct coupled to two Continuous Current Dynamos in Tandem.

Copies of the specification, general conditions, and form of tender may be obtained from the Township Electrical Engineer on payment of one guinea, which sum will be returned on receipt of a *bonâ-fide* tender.

Tenders, endorsed "Tender for Engine" or "Tender for Dynamos," as the case may be, must be addressed to the Chairman of the Council, and delivered at my office on or before 10 a.m. on Tuesday, November 4.

The Council do not bind themselves to accept the lowest or any tender.

F. P. Fawcett,
Clerk to the Council.

Town Hall, Rathmines, Co. Dublin,
October 16, 1913.

## RHYL URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The Council invite tenders for the following plant :—

One 160 kw. Diesel Engine Set.

Specification and form of tender may be obtained on application to the Electrical Engineer, Mr. E. H. Wright, Electricity Works, Rhyl, on payment of a deposit of one guinea for each copy, which sum will be returned on receipt of a *bonâ-fide* tender. Sealed tenders, endorsed "Diesel Engine," to be addressed and delivered to me not later than November 19, 1913.

The lowest or any tender will not necessarily be accepted.

Arthur Rowlands,
Clerk to the Council.

Council Offices, Rhyl,
October 15, 1913.

## EGYPTIAN GOVERNMENT.

MINISTRY OF PUBLIC WORKS.

Tenders are invited for the supply, delivery, and erection of :—

6 3,950 KVA Vertical Generators, 3-Phase, 5,000 Volts.
5 875 KVA Horizontal Generators, 3-Phase, 5,000 Volts.
Power House Switchboard.
3 Complete Sub-stations.
40,000 Volt Transmission Line.

Two copies of specification, general conditions, form of tender, etc., can be obtained on and after October 10 from

Messrs. Harper Bros. and Co.,
Consulting Engineers,
13, St. Helen's Place,
London, E.C.,

on payment of £1, which sum will be returned on receipt of *bonâ-fide* tender.

Tenders, sealed and endorsed as instructed, must be delivered to the above address on or before noon of the 10th November, 1913.

(*Continued on page* 379.)

Advertiser wishes to dispose of his copies of the illustrated issues of Tramway and Railway World from August, 1904, to September, 1909; perfect condition. Box 61, Tramway and Railway World, Amberley House, Norfolk Street, W.C.

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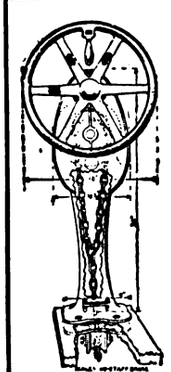

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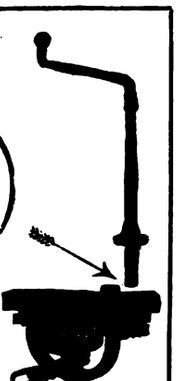

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THE
# Tramway AND Railway World

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SATURDAY, OCTOBER 18, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## IMPROVEMENTS IN EMPLOYEES' CONDITIONS.

During this disturbed year no tramwaymen in Great Britain have been so foolish as to withdraw their labour in support of requests which have been made for improved conditions. Some weeks ago we gave a list of municipal and company tramways which had granted concessions, and in view of the general labour unrest throughout the country it is not surprising that a number of additions have now to be chronicled. It has to be recorded to the credit of the Leeds tramwaymen that they recently refused to strike in support of demands made by the municipal gasworkers and labourers. The union men decided to honourably carry out their agreement which lasts until February next, but they are engaged in formulating an application for improvements on the expiration of the agreement. The Liverpool men, who had an unhappy experience of striking at the time of the railway strike in 1911, are to be given increases of pay at the instance of the manager, eighteen hundred employees sharing advances which will amount to between £6,000 and £7,000 per annum. At Manchester one shilling per week advance has been given, together with payment for overtime at the rate of time and a quarter for the first two hours and time and a half after eleven hours a day. A request for a full nine hours' day for the spare men has not been granted, but the Tramways Committee conceded a claim for seven days' holiday, with pay, instead of six days as at present, though when it came before the Workmen's Committee of the Council it was rejected. Subsequently the latter Committee granted this application in consideration of the exceptional circumstances of the tramwaymen's employment, such as working on bank-holidays when other workmen of the Corporation are free. The position of men engaged in the engineering departments is now to be considered. Ashton and District tramwaymen have gained advances of a farthing and a halfpenny per hour, while at Rochdale time and a-quarter is to be given for all work over eleven hours. Southend Corporation Tramway Committee, after considering returns relating to wages paid in 75 towns, have appointed a sub-committee to frame proposals for increases to all grades. Apparently, efforts are being made to secure further discussion of the badge question at Nottingham, although the men were content to allow it to subside for the present in consideration of the withdrawal of the bonus system and a concession as regards wind screens. At the instance of a Salford alderman, who acts as secretary to the national executive of the union, the Tramways Committee have been asked to receive another deputation, probably because of the fact that there are towns in which badge wearing is permitted. Similar agitations are now going forward at Birmingham and in connection with the Metropolitan Electric Tramway Company's employees. The latter were apparently not affected by the concession on the part of the "General" omnibus section of the London traffic combine, after the British Automobile Traction Company and the National Steam Car Company had led the way in return for a promise of freedom from the strike which then appeared imminent in other cases. Wearing of the badge should be permitted only on the understanding, as in the case of the L.G.O. Company, that any interference with non-union employees is to be regarded as an offence.

## THE MOTOR OMNIBUS AS AN ALLY.

One result of the recent Tramway Conference at Sheffield will be a renewal of interest in motor omnibuses as an adjunct to tramway services. What the delegates saw in Sheffield could not fail to impress them with the advantages of omnibus services as extensions of existing routes; while Mr. Fearnley's remarks on the subject encourage further study of the uses to which omnibuses may now be put by the operators of tramways. Hitherto the tramway man has had at least a latent feeling that the motor omnibus was an enemy rather than a friend, and that he ought to have nothing to do with the vehicle which he has so often been assured by the superficial critic is to supplant his cars. After Mr. Hamilton's paper on "Urban Passenger Transport," the tramway manager will, however, probably have little fear of the outcome of competition between the car and the omnibus in any case where a tramway service is justified. This being the case, he should the more readily appreciate the advantages that the omnibus has as a supplementary means of transport. Much of the prejudice against the omnibus was due to experience with them in the comparatively early days. The machines then were largely experimental, and they caused much trouble, entailed considerable loss, and gave rise in several instances to great disappointment. All that is happily now a thing of the past, and motor omnibuses of the latest types can to-day be bought with as great a sense of security as electrical tramway-car equipment. The working costs are well known to be within certain definite limits, and managers may purchase them without running serious risks. It is, no doubt, true that omnibuses of greater efficiency will be obtainable later, but that is not a sufficient excuse for putting off the use of them. As Mr. Fearnley said at Sheffield, it is most advisable that all our tramway systems should make some experiments with the motor omnibuses without delay. The experience will be useful in a variety of ways. It is fortunate, we think, that such large and successful tram-

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way undertakings as those of Newcastle, Liverpool, Birmingham and Sheffield are making use of omnibuses on a comparatively large scale. Earlier experiments with a few vehicles have not given sufficient opportunity to obtain reliable details, but with such fleets as those mentioned the results will be put beyond question. Already the vehicles in Sheffield have run over 100,000 miles, and have proved their reliability to the satisfaction of those responsible for their working. Most of the experience has been obtained in the summer, when the service is less exacting, but we have little doubt that the winter's performance will be relatively as good. It will, of course, be understood that in these remarks we have in mind services outside of the Metropolis. There the conditions are special, and there the motor omnibus has achieved a great success. That success has been enhanced by the peculiarly favourable circumstances that provide a free permanent-way for the use of the omnibuses—a condition that cannot be expected to continue indefinitely. But, even allowing for this fact, the London omnibus is an astonishing success financially, while it is an immense boon to the public. In the provinces the conditions are vastly different, but the experience in London and its vicinity augurs well for success further afield. Tramway committees must recognise the fact that motor omnibuses will have, sooner or later, to come into their area. The question for the committees to determine is whether they shall introduce the new-comer or whether they will decline to receive it until forced to do so. Birmingham has set a good example.

## THE RATING APPEAL IN THE HOUSE OF LORDS.

We have received from the Tramways and Light Railways Association the following correspondence which has passed between the Chairman of the Association and the Lord Chancellor with regard to some remarks made by Lord Moulton when delivering judgment in the House of Lords in the rating appeal case of Tottenham U.D.C. *v.* Metropolitan Electric Tramways Company in June last. The judgment was reported in our issue of August 14, 1913.

The Right Honble. Viscount Haldane, K.T.

My Lord,—The attention of the Tramways and Light Railways Association has been drawn to the expressions used by Lord Moulton in his judgment in the case of the Tottenham Urban District Council and Metropolitan Electric Tramways, Limited.

This was an appeal case on the question of the rating of tramways, and while my Association holds very strong views both on the judgment itself and the manner in which Lord Moulton arrived at the decision and announced it, I only desire on this occasion to draw attention to a complete misrepresentation by Lord Moulton of the action of tramway promoters under the Light Railways Act due to his ignorance of the history of the Act itself.

Lord Moulton in his judgment said—

"Tramway promoters were astute enough to see that undertakings which were purely and simply schemes for the construction of tramways in the ordinary sense of the word might be put forward under the guise of being schemes for the construction of light railways, and that *if they could successfully elude the vigilance of the authorities*, they would thereby gain for the tramways the exceptional privileges intended only for undertakings of a widely different character. In this attempt they were only too successful, and by reason of *what I have no hesitation in regarding as an abuse of the Act*, schemes were sanctioned under the authority of the Light Railways Act, 1896, for the construction of what ought to have been regarded as tramways, and subjected to the carefully considered conclusions of the Legislature in respect thereto which are embodied in the Tramway Act."

This statement is both offensive and unjust. Mr. Ritchie, President of the Board of Trade, in introducing the Light Railways Bill, said—

"Under this Bill a scheme for the construction of Light Railways might be proposed by Local Authorities such as a County, *Town*, or District Council, or by a Railway Company, a *Tramway* Company, a company *ad hoc*, or a combination of these."

He went on further to say—

"It was, perhaps, not generally known that local authorities could not at present make *tramways* without obtaining Parliamentary powers in some form or other, and even when such powers were obtained, they could not work the tramways except in special cases. This Bill sought to remove those disabilities."

Mr. Ritchie also said—

"The Bill of the Government would . . . afford facilities for making branches of existing railways upon a large scale, but with a different gauge if it were desired, and also for making such railways as in Belgium."

These Belgian railways are practically the same as our tramways.

Lord Dudley, in introducing the Bill into the House of Lords, said—

"The Bill included not merely all tramways, but all railways which the Board of Trade thought might justly be brought within its scope.

"*It certainly included tramways in towns*, and it might include trunk lines throughout the country."

If Lord Moulton had studied the history of the Light Railways Act, he would at least have refrained from making offensive remarks about those who have built up a great and beneficial industry under great difficulty and discouragement, and a knowledge of the real facts might have prevented him from adopting the biassed and prejudiced attitude which he thought fit to maintain throughout the hearing of the appeal.

I am, my Lord, your obedient servant,
(Signed) Arthur Stanley, Chairman.

September 24, 1913.

My Dear Stanley,—The Lord Chancellor has read your letter of the 24th inst. on behalf of the Tramways and Light Railways Association, and wishes me to write you in answer.

I am afraid that if the Judge in a cause, after the judgments were delivered, were called upon to hear the criticisms of unsuccessful suitors, there would soon be an end of all legal decisions. The inconvenience of such a practice would be specially obvious in the case of the Final Court of Appeal, whose judgment is accepted as the final settlement of the law.

Believe me, yours truly,
(Signed) A. G. C. Liddell,
Private Secretary.

September 30, 1913.

The Right Honble. Viscount Haldane, K.T.

My Lord,—I beg to acknowledge the receipt of your reply to my letter of the 24th ult.

Mr. Liddell states that you read my letter, in which case I fear I must have expressed myself badly, as you have evidently misunderstood its meaning. If you will kindly refer to it again you will see that I did not criticise or find fault with the judgment in the case of Tottenham U.D.C. *v.* Metropolitan Electric Tramways Company, but that I thought it right, on behalf of those interested in the tramway industry, to point out to you that the statement of your colleague, Lord Moulton, to the effect that tramway promoters had made a wrong use of the Light Railways Act (constituting according to him, "an abuse of the Act") was absolutely unwarranted, and I further pointed out that even a cursory study of the history of the Act would have saved Lord Moulton from making a statement—in which you presumably concurred—which was both unfounded and unfair.

The judgment is irrevocable, and the only way in which we can make known our emphatic protest against the manner in which we have been treated by Lord Moulton and yourself is by publishing this correspondence, which I propose to do, after a few days' delay in case you should wish to reply to this letter.

I am, my Lord, your obedient servant,
(Signed) Arthur Stanley, Chairman.

October 6, 1913.

House of Lords, S.W.,
October 11, 1913.

Dear Stanley,—I am desired by the Lord Chancellor to acknowledge the receipt of your letter of the 6th inst.

I am, yours truly,
(Signed) A. G. C. Liddell.

Hon. Arthur Stanley, M.P.

## TRAMWAY AND RAILLESS PROPOSALS.

Bolton.—A Bill is to be promoted for the carrying out of tramway extensions.

Bournemouth.—A considerable length of track is to be doubled and relaid, and the manager has been directed to report generally on the subject of providing omnibuses in connection with the tramways services.

Burnley.—The manager has been asked to report on the question of providing a tramway between Stoneyholme and Brunshaw Bottom.

Cardiff.—For the purpose of preventing congestion the track in Ninian Road is to be doubled at a cost of £6,010.

Dunfermline.—In connection with the Council's town planning scheme at Rosyth, the naval base, Mr. Balfour, of the Dunfermline and District Tramways Company, has stated that when the tramways are extended to the dockyard, the company would pay £1,000 per mile of double track and £500 for single track for road making on all sections of the roads where the tracks could, without detriment, be laid on ballast instead of on granite setts.

Edinburgh.—A proposal for using the self-propelled car on the city tramways and for its working in connection with the existing cable service will be submitted to the Corporation by the Tramways Committee. The new route will begin at the Craiglockhart cable terminus, proceed to Fir Hill, and thence to join the existing

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tramway at Comiston Road, traversing a pleasant route of 5½ miles. Another scheme provides for an extension to Corstorphine, passing the Zoological Gardens, a distance of 1 mile 660 yards.

NEWCASTLE-ON-TYNE.—By the Tramways Committee a recommendation is to be brought forward in favour of promoting a Bill to extend the tramways to Benton, in the district of Longbenton; Council, and to run motor omnibuses from the terminus to the various centres of the Longbenton Council's area.

NEWPORT.—A scheme for running railless trolley cars within and, without the borough, in the lower part of the Western Valley, is before the Tramways Committee.

NORTHAMPTON.—In February next the work of extending the tramways to Far Cotton and doubling the Kingsthorpe Road section is to be begun, the Corporation arriving at this decision at their October meeting. The Tramways Committee were instructed to consider the question of erecting shelters at various points on the present system.

NOTTINGHAM.—There is to be an extension of the tramways along Derby Road. It is not expected that the work will be started until March next.

PLYMOUTH.—It is proposed to apply for a Provisional Order for tramway extension to Crownhill at an estimated cost of £24,700, inclusive of four cars, and to Laira at an estimated cost of £30,348, inclusive of five cars. Owing to the cost which would be involved in obtaining an Act for running railless trolley cars, as against the small cost entailed by a Provisional Order for tramway extensions, the committee regretted that they were unable to submit reliable estimates relating to the former system.

PRESTON.—The Tramways Committee recommend the promotion of a Bill for powers to extend the tramways on three routes.

WALSALL.—It is proposed by the General Purposes Committee that steps be taken to promote a Bill both for extending the tramways by means of trolley vehicles and also motor omnibuses.

WEST BROMWICH.—At the October meeting of the Town Council a memorial was received asking the Corporation to avail themselves of the powers conferred by the Corporation Act in respect of the provision of vehicular conveyances to and from the Old Church district. The Highway Committee presented a report stating that they were considering the question. The Borough Surveyor had been to Leeds, Bradford, and other places where trackless trolley systems were in operation.

YORK.—Powers will be sought next session for an extension of the tramways through Walmgate to Hull Road, and to the centre of Acomb Village, together with railless trolley car installations to Heworth; from Nessgate along Huntington Road to Haxby Road; to the Leeman Road district via Bootham and Clifton, and into the Burton Road district. Alderman Meyer, chairman of the Tramways Committee, has stated that the extensions proposed would mean practically the doubling of the present mileage, which cost £130,000, at an expenditure of only £72,000. Probably the actual cost to the city would be a ¾d. rate, and if that were so, there was no risk to the city, because the tramway assessment produced that amount for the rates. Motor 'buses as a permanent service would be more expensive than tramways, though the inclusion of such powers in the Bill would be extremely useful for testing new routes.

## L.C.C. TRAMWAY MATTERS.

The London County Council resumed their meetings after the summer recess on Tuesday last when the agenda contained numerous reports of the Highways Committee relating to the tramway undertaking.

### ADVERTISING THE TRAMWAYS SERVICES.

In regard to advertising the tramways, the Highways Committee stated that for some time copies of the tramway map and guide had been distributed in the Council's schools, and the following arrangements had now been agreed upon in connection with the education service:—A tramway map to be arranged in 12 sections and the blocks for these sectional maps to be provided by the education officer at actual cost and to indicate evening institutes and polytechnics, this map to be part of the booklet of trade classes, etc., circulated each year. A special tramway map to be prepared, showing the schools of art, polytechnics, secondary schools, etc., this map to be published with the hand-book of classes for teachers dealt with by the secondary school section. Reference to be made to the tramway service where applicable to secondary and special schools advertised in the local press. Posters proposed to be exhibited in respect of secondary schools to indicate, where applicable, the tramway routes which might be used with advantage, 500 whole side spaces on the cars to be used during September and October for advertising the education service if spaces are available, and 1,000 ventilator glaciers (if available) to be used in addition to the 280 ventilator glaciers already provided for advertising secondary schools. The chief officer of tramways to arrange for the printing and issue of a leaflet giving a list of universities, polytechnics, and other educational institutes, and the appropriate tramway services. The tramway routes serving the different districts to appear on the posters advertising the schools.

It was further recommended that a resolution of July 8 last authorising the invitation of tenders for the provision of illuminated signs in connection with the advertising of tramway service on tramway buildings and other sites should be rescinded.

### GREENWICH POWER STATION DEVELOPMENT.

The Committee reported that under arrangements which had been made the Anglo-Swedish Electrical Welding Company had repaired defective flanges on the steam pipes of Greenwich generating station at a cost of £785 16s.

Tenders had been received for the provision of foundations required in connection with the substitution of turbines for reciprocating engines at the Greenwich station, and the Committee had accepted the tender of Kerridge and Shaw. The amount according to the priced schedule was £7,230, but this did not represent the value of the work, which would be measured and valued on the detailed prices in the accepted schedule. After the receipt of the tenders it was ascertained that the delivery of the first turbine might be expected towards the end of November, and it had been arranged that Kerridge and Shaw would complete the foundation work for the first turbine in three months instead of four, subject to the payment of an additional sum of £375.

The under-mentioned tenders for the provision of high tension switchgear, etc., required for Greenwich station were opened during the recess:—

| | | |
|---|---|---|
| Bertram Thomas ... ... (incomplete tender) | £10,823 | 0 0 |
| British Westinghouse Co. ... ... ... ... | 17,915 | 5 8 |
| British Thomson-Houston Co. ... ... ... | 2,112 | 10 0 |
| Siemens Bros. Dynamo Works ... ... ... | 20,073 | 13 8 |
| Ferranti, Limited ... ... ... ... ... ... | 22,304 | 8 0 |
| Johnson and Phillips ... ... ... ... ... | 22,886 | 0 0 |
| A. Reyrolle and Co. ... ... ... ... ... | 24,351 | 2 6 |

The estimate of the chief officer was £18,000. In submitting his tender Mr. Bertram Thomas stated that as he had been unable to obtain a quotation for the coupler switches of the special make called for no figure had been included therefor in his offer, but that he was prepared to quote for an alternative switch. The Committee decided to accept the lowest complete tender, and acting on authority given them they accepted that of the British Westinghouse Company, with power to sublet as follows:—(1) Johnson and Phillips, cables; (2) British Thomson-Houston Company, coupler switches and regulators; (3) Morgan Crucible Company, carbon resistances; (4) Everett, Edgcumbe and Company, relays.

The Committee had accepted an offer by J. Cochrane and Sons for the laying of condensing water pipes in the bed of the River Thames at Greenwich station, on the basis of the actual cost of labour and materials, together with a percentage of 13.05 not exceeding £2,750 for general charges and contractor's profit.

The Committee had accepted the offer of the British Westinghouse Company to supply for £5,043 thirteen reactance coils and two steel valve chests required for the provision of protective devices for the existing plant at Greenwich station.

### WIRING OF CAR SHEDS.

The Council on March 4 last accepted the tender of Williams and Bach amounting to £2,139 11s. for the wiring of the Camberwell and Cressy Road car sheds. During the summer recess the firm asked to be released from the contract. The Committee agreed, and decided to accept the tender of Electrical Installations, Limited, amounting to £2,146 0s. 11d.

### SHOREDITCH SUB-STATION.

The Committee had accepted the tender of H. L. Holloway, Deptford, for the provision of foundations for rotary converters to be installed in Shoreditch sub-station and for additional workshop accommodation, etc., the cost to be based on a schedule of prices.

### REFERENCES TO CONCILIATION BOARDS.

The Committee had before the recess considered a request made by trade unions that the rate of pay for fitters, turners, millwrights, tool-makers, slotters, planers, blacksmiths, hammermen, and the various classes of machine workers of the tramway department should be increased by 1d. an hour. They decided not to accede to the request. So far as regarded hammermen, the rate of pay was fixed by agreement arrived at by the Conciliation Board on February 19 last, and was accepted by the Council on March 4. Under the terms of the Conciliation Boards scheme a decision of a board which had been accepted by the Council and the employees might not be re-opened until after the expiration of twelve months. Considerable correspondence took place during the recess, and conference had been held with representatives of the trade unions affected, with the result that it had now been agreed that the application for increased pay (including that of hammermen) should be referred to the appropriate Conciliation Board. A petition had been received from the car-washers employed in the tramway department asking for an increase of 3s. a week in their rate of pay. There were at present 735 regular washers and 115 spare washers. The rate of pay commenced at 27s. 6d. a week, rising to 30s. Spare washers were paid 4s. 7d. a night. The Committee were of opinion that the request should not be agreed to. The men had been informed of this decision, and had now asked that their application should be referred to the appropriate Conciliation Board, and the Committee recommended that this should be done.

All the recommendations were adopted.

### TRAILER CARS.

Replying to questions, Mr. G. H. Hume, on behalf of the Highways Committee, said that the Council were at present operating eight trailer cars. The results had been satisfactory. The certificate of the Board of Trade was only provisional; when the final certificate was received the extension of the trailer car system in London would be fully dealt with. The Committee were alive to its importance. He could not say when the final certificate of the Board of Trade would be received, but the Committee were moving.

**Additional P.A.Y.E. Car at Gateshead.**—The Gateshead and District Tramways Company have recently placed a new P.A.Y.E. car on the Low Fell route.

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## MISCELLANEOUS NEWS AND NOTES.

**The British Electrical and Allied Manufacturers' Association.**—The annual dinner of this Association will take place on Wednesday, January 21, 1914, when Lord Ampthill will preside.

**Rejection of the Sydney Underground Scheme.**—On October 14 the Legislative Council rejected the Bill, already passed by the House of Assembly, authorising the construction of an underground railway and tramways in Sydney, at an estimated cost of £4,800,000.

**Southport's Railless Trolley Powers.**—The Tramways Committee have directed Councillor Richardson, Alderman Griffiths, and the tramways manager to investigate the question of running cars on the trackless trolley system, as authorised by the new local Act, and have authorised them to visit Leeds in order to see Mr. J. B. Hamilton, the Leeds tramway manager, and report to the committee.

**The Position of Tramway Standards.**—In reply to a deputation from the Lancashire and Cheshire branch of the Roads Improvement Association respecting the erection of tramway standards in Manchester, the tramways manager stated that it was usually found impossible to erect the poles far from the edge of the kerb owing to the numerous gas pipes and electric wires that run under the footpath. He, however, promised always to do his best to meet the Association's wishes.

**Trail Cars in London.**—In reply to an inquiry from the Board of Trade, the Woolwich Council have stated that they have observed no undue interference with the ordinary traffic consequent on the running of trail cars by the London County Council between Beresford Square, Woolwich, and Eltham, and between Nile Street, Woolwich, and Abbey Wood. A number of trail cars are also working most satisfactorily on the route between Embankment and Tooting.

**Return of Dublin Strikers.**—On October 10 the majority of those tramway employees who went on strike applied for reinstatement. Men with a good record were re-engaged, and the full service of cars is now in operation. Mr. W. M. Murphy, chairman of the Tramways Company, in an interview, said that the fight was not against the trade unions at all. It was the fight of the masters to protect themselves against the ruin of their businesses. He went so far as to say that he would not object to the Irish Transport Union if it could only keep agreements like other bodies. For all practical purposes, he said, he is now out of the dispute as far as his concerns are affected.

**Leicester Tramway Employees Praise the P.A.Y.E. Cars.**—At a well attended meeting of the Leicester branch of the Amalgamated Association of Tramway and Vehicle Workers, the advantages of the P.A.Y.E. system over that of the old type of car were discussed, and the following resolution was adopted:—"That we deeply regret the attitude taken by the Town Council, and a small section of the public, with regard to the proposal of Alderman Flint to extend the P.A.Y.E. system in Leicester. Those of us who have had the experience of working both systems, claim that we should know something of the advantages of the P.A.Y.E. over the old cars, and we are unanimous in our approval of the P.A.Y.E. system. We are also unanimously of the opinion, that, viewed from every standpoint, the system is far superior to the old one."

**Liverpool's Separate Entrance and Exit Cars.**—Reviewing the work of the past year on October 10, Alderman F. Smith, chairman of the Tramways Committee, mentioned that on February 16 they decided to have a sample car built of the new type designed by the general manager, with a separate entrance and exit both from the lower and upper decks. The car was found to be very popular, and the committee decided to build six more of the same type, two of which were already in the service and had proved most satisfactory, the remaining four being in course of construction. The committee on January 17 decided to try experimentally automatic point controllers. Two of these appliances were put into service, and one had proved very satisfactory, whilst the other had not proved quite so satisfactory. The system of collecting the fares from passengers as they enter the cars had been tried experimentally for three months, but at the time of the maximum traffic it was found impossible to carry it out to the full extent. The general manager, however, was of opinion that it was helpful to the conductor to collect as many fares as possible on the platform without causing delay.

## PERSONAL.

**Mr. A. T. Goward,** manager of the British Colombia Electric Railway Company at Victoria, has left that city on a visit to the directors in London.

**Mr. J. R. Taylor,** chief clerk, Ashton tramways department, has resigned consequent upon having been appointed to a similar position at Walsall, his native town.

**Alderman Linsley,** chairman of Salford Corporation Tramways Committee and the new President of the Municipal Tramways Association, is the first President elected from outside the ranks of tramway managers.

**Mr. J. Dalrymple,** Glasgow tramways manager, and Mr. Nisbet, master of works, on October 1 had reached Vancouver in the course of their tour to inspect tramway systems and bridges. They were greeted by many former employees of the Glasgow Corporation, nearly a hundred Glasgow tramwaymen now being employed on the Vancouver tramways and in other positions. The travellers are expected to reach Glasgow at the end of October.

**Sir Maurice Fitzmaurice** was a passenger by the P. and O. steamer "Mongolia," which left the Thames on October 3 for Australia, where he is to advise the Government on the question of constructing naval bases.

**Mr. G. C. I. Stuart,** of the Manchester Council's electricity works, and formerly resident engineer at the Brakpan power station of the Victoria Falls and Transvaal Power Company, has been appointed superintendent of the Buenos Ayres power station of the Central Argentine Railway.

**Alderman Fred Smith,** whose accession to the chair of the Liverpool Tramways, Electric Power and Lighting Committee last year was marked by considerable discussion, was, on October 10, at the closing meeting of the Committee for the municipal year, accorded a vote of thanks on the motion of Major Clarke, seconded by Mr. Hutchinson, and supported by Councillors Clancy, Gates, and Robinson. In responding, he remarked that he was in his fifteenth year of service on the Tramways Committee. He had every reason to be thankful for the help that had been given to him by every member of the Committee and all the officials attached to the Committee. He moved a voted of thanks to the deputy-chairman, Major Clarke, who, he said, had been very helpful to him in the work of the Committee. He had never seen a member of the Council who had taken more work in hand. Councillor W. J. Bailes was thanked for his services as chairman of the Electrical Sub-Committee.

**Mr. G. F. Milnes,** whose death at Birkenhead is announced, was for many years connected with the firm of G. F. Milnes and Co., which ultimately became absorbed in the United Electric Car Company, Limited. Mr. Milnes was afterwards the resident representative of that company in London. His son, Mr. G. C. Milnes, who is now in Alberta, and Mr. Voss established the firm of Milnes, Voss and Co., of which Mr. Voss is now the head.

**Mr. J. H. Cawthra,** who, during the past two years had been chief mechanical engineer to the Victoria Falls and Transvaal Power Company, died on October 8 from injuries received while he was motoring near Johannesburg, the car colliding with a train at a level crossing. Mr. Cawthra was from 1901 borough electrical engineer at South Shields, and he had also held a similar position at Swansea. He had also held the appointment of chief assistant electrical engineer at Leeds electricity works.

## CONTRACTS AND ORDERS.

**Ramsbottom Council** have accepted the tender of the Polack Tyre and Rubber Company, Limited, Manchester, for tyres for the railless trolley cars for twelve months, and of Mr. Rawlinson for a tower wagon.

**Bradford Corporation** have ordered 20 Dick Kerr standard 40 h.p. motors, at £104 each, for the tramcars running between Bradford and Leeds. Tenders for supplies to the tramways department have been placed as follows:—Tangyes, Limited, armature winding machine, £88, wheel-turning lathe, £808; Leeds Engineering and Hydraulic Company, Limited, two sets hydraulic jacks, £230; J. Keith and Blackman Co., Limited, smiths' hearths (two single and one double), £81; Carrick and Ritchie, travelling crane, £535.

**London County Council** have entered into contracts as under:—Kerridge and Shaw, provision of foundations required in connection with the substitution of turbines for reciprocating engines at Greenwich power station; British Westinghouse Company, high tension switchgear, etc., for Greenwich power station, £17,915; J. Cochrane and Sons, laying condensing water pipes in the bed of the River Thames at Greenwich power station; Electrical Installations, Limited, wiring of Camberwell and Cressy Road car sheds, £2,140; H. L. Holloway, foundations for rotary converters to be installed at Shoreditch sub-station, and additional workshop accommodation, etc.; British Westinghouse Company, thirteen reactance coils and two steel valve chests required in connection with the provision of protective devices for the existing plant at Greenwich power station, £5,943; Hadfield's Steel Foundry Company, special trackwork for junction lines at Tooting Broadway, £1,800; Ashworth, Son and Company, Dewsbury, 20-ton weighbridge for Belvedere Road depôt, £136; National Rail and Tramway Appliances Company, five hydraulic pit-jacks, £35 10s. each; Carborundum Company, rail grinding blocks for the next 12 months, 4s. 6d. per block, less 2½ per cent. discount, total amount about £270; J. G. Ingram and Son, repair of 196 india-rubber plough bases burnt, etc., estimated cost £196 13s.; John Brown and Co., 18 tons special hard rolled steel plates, £219 (approximately); John Brown and Co., 45 bars of insert steel, £192 (approximately); R. R. Todd, High Holborn, 520 copper bonds, £127; Anderston Foundry Company, 200 cast iron extended arm yokes and 200 cast iron short yokes, £290 15s.; Brecknell, Munro and Rogers, 1,500 trolley wheels, £193 15s.; Imperial Light, Limited, Westminster, 36 acetylene lamps, 1,000 c.p., £135; Bayliss, Jones and Bayliss, 2,000 tie rods for extended yokes, £193.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended October 11 amounted to £231,519, or £12,468 more than in the corresponding week last year, while the track mileage was 2,802, or 80 more than for the corresponding week. The receipts were at the rate of £80 17s. 10d. per track mile, an increase of £2 2s. 6d. per mile as compared with last year.

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(Continued from page 374)

## POSITIONS VACANT.

### BOROUGH OF ROYAL TUNBRIDGE WELLS.

ELECTRICAL UNDERTAKING.

APPOINTMENT OF CHIEF ASSISTANT ELECTRICAL ENGINEER.

The Corporation of Royal Tunbridge Wells propose to appoint a Chief Assistant Electrical Engineer, at a salary of £170 per annum, increasing by yearly increments of £10 to £200; such Chief Assistant to hold office during the pleasure of the Council, and to devote the whole of his time to the service of the Corporation.

Applicants must have had experience of a high tension alternating single-phase system.

Applications, stating age and experience, accompanied by copies of not more than three recent testimonials, should be sent to me at the Town Hall, Tunbridge Wells, on or before October 27, 1913, endorsed "Chief Assistant Electrical Engineer."

Canvassing members of the Council, either directly or indirectly, will disqualify an applicant.

By order, W. C. CRIPPS,
Town Clerk.

Town Hall, Royal Tunbridge Wells,
October 14, 1913.

### COUNTY BOROUGH OF SUNDERLAND.

ELECTRICITY DEPARTMENT.

ASSISTANT SALES MANAGER.

Applications are invited for the post of Assistant Sales Manager at a salary of £200 per annum.

Candidates must have a thorough technical electrical training, supplemented by experience gained in commercial work, preferably in the sales department of a public electricity supply undertaking.

Applications, stating age and details of both technical and commercial training, and accompanied by copies of not more than three recent testimonials to be endorsed "Assistant Sales Manager," and be delivered to the undersigned not later than first post on Thursday, the 30th inst.

ALFRED S. BLACKMAN,
General Manager.

Electricity Offices,
Dunning Street, Sunderland.

### MANAGING DIRECTOR.

A Managing Director wanted; salary, £2,500 per annum. James Sutherland Warner, Westminster Palace Hotel.


SIMPLEX CONDUITS, Ltd.

GARRISON LANE, BIRMINGHAM.

Makers of Simplex Steel Conduit System and

WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.

MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).

500 page Catalogue sent free on request.

DICK, KERR & CO.,
Limited,

ABCHURCH YARD, CANNON STREET,
LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.


## FINANCIAL REPORTS AND MEETINGS.

**Record Nine Months at Liverpool.**—At the last meeting of the expiring municipal year of the Liverpool Tramways Committee, Alderman Fred Smith reported the first nine months of the present year had proved a record over all previous years, both as regarded total receipts, number of passengers carried, and receipts per car mile. The receipts amounted to £505,016, compared with £469,016 in 1912, an increase of £36,000, or 7.67 per cent. The passengers numbered 107,457,935, against 99,903,672, an increase of 7,554,263, or 7.56 per cent. The mileage was 10,034,045, against 9,349,669, an increase of 684,376, or 7.32 per cent.; and the earnings per car mile were 12.07d., against 12.04d., an increase of .03d.

**The British Electrical Federation.**—The traffic statement for the week ended October 10, 1913, shows that the receipts from tramways and railways amounted to £40,008, as compared with £37,205 in the corresponding week last year, and from omnibuses £11,920, as compared with £1,221, making a total of £51,928, as compared with £38,426. The tramway and railway route mileage was 429.82, as compared with 428.46. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working, both last year and this year, the receipts show an increase of £2,858 upon the week.

**Manchester's Half-Yearly Results.**—Mr. J. M. McElroy has presented his summary of the results of the working of the tramways department during the first half of the financial year. The mileage run was 9,769,574, an increase of 324,047, as compared with the corresponding period of 1912, and the passengers carried numbered 102,144,962, an increase of 9,920,230. The electrical energy used was 726,927 units fewer—14,673,871 as compared with 15,400,798—and the units per car mile were reduced by .128—1.502 as compared with 1.630. The revenue per car mile was at the same time increased from 11.369d. to 11.561d., but the working expenses per car mile were only increased from 7.002d. to 7.036d.

## COPPER AND ALUMINIUM MARKET.

October 17, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, October 17. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 73 0 0 | 72 0 0 | 76 0 0 |
| ,, ,, (three months) .. | 72 17 6 | 72 0 0 | 77 0 0 |
| Electrolytic Copper—bars or ingots .. | 77 0 0 | 77 10 0 | 81 10 0 |
| Aluminium—bars or ingots .. .. .. | 83 0 0 | 84 0 0 | 83 10 0 |

## COAL MARKET.

October 17, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, October 17. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 24 6 | 24 6 | 22 6 | 22 0 |
| Best Seconds .. .. .. | 23 6 | 23 6 | 22 0 | 21 3 |
| Ordinary Drys .. .. | 21 0 | 21 0 | 20 3 | 20 0 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | 19 6 | 19 6 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 18 0 | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 0 | 20 0 | 17 0 | 17 0 |
| Best Seconds .. .. | 19 0 | 19 0 | 16 6 | 16 3 |
| Ordinary Drys .. .. | 16 6 | 16 6 | 14 9 | 15 0 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 14 0 | 14 6 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 12 6 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 16 0 | 15 3 | 13 6 | 12 3 |
| Best Seconds .. .. | 13 6 | 13 6 | 12 6 | 10 0 |
| Smalls .. .. .. | 8 6 | 8 6 | 10 0 | 6 0 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Oct. 14 | £54,603 | £52,547 | 41 | £2,265,090 | +£178,461 |
| Auckland (28 days) | Sept. 26 | 18,498 | 19,943 | 13 | 61,553 | + 2,595 |
| Ballarat and Bendigo | Aug. 31 | 829 | 870 | 22 | 19,170 | — 308 |
| Brazilian St. Rly. Mlrs. | August | 40,419 | 50,402 | 4 | 50,402 | + 9,983 |
| Brazilian Traction | Oct. 11 | 81,994 | 95,021 | 41 | 3,678,622 | + 51,598 |
| Brisbane | Sept. | 22,700 | 25,590 | 39 | 232,768 | + 51,674 |
| British Columbia .....$ | August | 675,272 | 770,628 | 8 | 1,526,571 | + 201,054 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,078 | + 1,750 |
| Buenos Aires Lacrose | Sept. | 43,363 | 44,261 | 39 | 133,945 | + 6,907 |
| Calcutta.....Rs. | Oct. 11 | 68,914 | 69,438 | 41 | 26,59,698 | + 1,46,255 |
| Cape Town | Sept. | ... | 11,290 | ... | ... | ... |
| Carthagena & Herrerias | Sept. | 2,932 | 1,844 | 39 | 24,661 | + 5,395 |
| East India | Sept. | 1,931 | 2,028 | 8 | 4,033 | + 190 |
| Kalgoorlie | Sept. | 3,251 | 3,068 | 39 | 26,447 | — 2,841 |
| La Plata | Sept. | 4,183 | 4,528 | 39 | 45,511 | + 9,415 |
| Lima | Sept. | 22,660 | 34,110 | 39 | 300,647 | + 23,783 |
| Lisbon ..... Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,438 |
| Madras (14 days) Rs. | Oct. 15 | 25,377 | 26,161 | 41 | 510,344 | + 35,831 |
| Melbourne | Sept. | ... | 62,000 | ... | ... | ... |
| Mexico .....$ | Sept. | 587,734 | 604,744 | 39 | 5,116,331 | + 107,699 |
| Montevideo | Sept. | 27,711 | 27,870 | 47 | 344,301 | + 26,484 |
| Para | Oct. 12 | 4,728 | 4,490 | 45 | 179,911 | + 551 |
| Perth (W.A.) | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai .....$ | Oct. 8 | 21,735 | 26,000 | 40 | 884,852 | + 99,717 |
| Singapore .....$ | Oct. 11 | 11,220 | 18,404 | 41 | 459,925 | + 63,152 |
| Toronto .....$ | August | 727,925 | 850,222 | 34 | 6,317,674 | + 864,574 |
| Winnipeg.....$ | August | 308,764 | 340,507 | 34 | 2,649,702 | + 221,372 |

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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregates. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Oct. 8 | £1,483 | £1,636 | + £153 | 19 | £32.700 | + £2.151 |
| Ayr Corporation ..... | ,, 11 | 223 | 262 | + 39 | 20 | 10,507 | + 1,389 |
| Bath Electric ..... | ,, 8 | 853 | 916 | + 63 | 41 | 40,589 | + 3,155 |
| Birkenhead Corp. ..... | ,, 12 | 1,167 | 1,245 | + 78 | 28 | 36,540 | + 3,046 |
| Birmingham Corp. ..... | ,, 11 | 10,944 | 12,275 | + 1,331 | 28 | 324,236 | + 26,364 |
| Blackburn Corporation | ,, 8 | 1,189 | 1,331 | + 142 | 28 | 37,800 | + 3,682 |
| Blackpool & Fleetwood | ,, 11 | 580 | 612 | + 32 | 15 | 26,389 | + 4.236 |
| Blackpool Corporation | ,, 9 | 1,016 | 1,291 | + 275 | 27 | 69,015 | + 10.841 |
| Bolton Corporation ..... | ,, 12 | 2,634 | 2,748 | + 114 | 28 | 77,408 | + 4,443 |
| Bournemouth Corp..... | ,, 15 | 1,679 | 1,935 | + 256 | 28 | 65,234 | + 7,738 |
| Bradford Corporation... | ,, 11 | 5,790 | 5,797 | + 7 | 28 | 163,176 | + 10,207 |
| Brighton Corporation... | ,, 12 | 932 | 1,047 | + 65 | 28 | 34,125 | + 2,283 |
| Bristol ..... | ,, 10 | 7,034 | 7,760 | + 736 | 40 | 329,654 | + 45,662 |
| British Elec. Federatn. | ,, 10 | 38,426 | 51,928 | * | ... | ... | ... |
| Burnley Corporation ... | ,, 11 | 1,678 | 1,804 | + 126 | 28 | 48,551 | + 5,977 |
| Burton-on-Trent Corp. | ,, 12 | 273 | 333 | + 60 | 28 | 8,299 | + 399 |
| Bury Corporation..... | ,, 12 | 1,354 | 1,378 | + 24 | 28 | 38,625 | + 1,445 |
| Cardiff Corporation..... | Sept. 20 | 2,514 | 2,712 | + 198 | 25 | 69.621 | + 7,742 |
| Chatham and District.. | Oct. 9 | 906 | 1,012 | + 106 | 40 | 37,681 | + 2,340 |
| Chesterfield Corp. ..... | ,, 9 | 228 | 261 | + 33 | 27 | 7,197 | + 915 |
| Colne & Trawden..... | ,, 11 | 292 | 262 | — 30 | 41 | 11,328 | + 722 |
| Cork Electric..... | ,, 9 | 434 | 519 | + 35 | 40 | 20.364 | + 462 |
| Croydon Corporation ... | ,, 8 | 1,793 | 1,817 | + 24 | 26 | 45,152 | — 4,783 |
| Darlington Corporation | ,, 11 | 227 | 254 | + 27 | 28 | 7 049 | + 719 |
| Derby Corporation ..... | ,, 11 | 910 | 1,001 | + 91 | 28 | 28,064 | + 3,039 |
| Dover Corporation ..... | ,, 11 | 234 | 247 | + 13 | 28 | 7,805 | + 139 |
| Dublin & Lucan ..... | ,, 10 | 152 | 109 | — 43 | 14½ | 2,439 | + 5 |
| Dublin United ..... | ,, 10 | 5,966 | 3,707 | — 2.259 | 40 | 227,889 | + 10,204 |
| Dundee City ..... | ,, 8 | 1,285 | 1,390 | + 105 | 21 | 28,147 | + 2,118 |
| East Ham Corporation | ,, 11 | 1,027 | 999 | — 28 | 28 | 28.547 | — 1,369 |
| Exeter Corporation ..... | ,, 10 | 337 | 346 | + 9 | 28 | 10,111 | + 466 |
| Gearless Motor 'Buses. | ,, 11 | ... | 579 | ... | 27 | 13,315 | ... |
| Glasgow Corporation ... | ,, 11 | 20,081 | 21,009 | + 928 | 19 | 332,060 | + 27,300 |
| Glossop(U. Elec.Supply) | ,, 11 | 130 | 130 | Nil | 41 | 5,344 | + 576 |
| Halifax Corporation ... | ,, 7 | 1,976 | 2,019 | + 43 | 27 | 59,604 | + 1,451 |
| Hastings & District..... | ,, 9 | 986 | 989 | + 3 | 41 | 44.182 | + 8,209 |
| Huddersfield Corp. ..... | ,, 11 | 2,012 | 2,078 | + 66 | 28 | 60,497 | + 3,812 |
| Hull Corporation ..... | ,, 11 | 3,674 | 3,866 | + 192 | 28 | 86,543 | + 4,335 |
| Ilford U.D.C. ..... | ,, 11 | 397 | 440 | + 43 | 28 | 12,829 | — 1,421 |
| Ilkeston Corporation ... | ,, 15 | 117 | 132 | + 15 | 29 | 3,878 | + 651 |
| Ipswich Corporation ... | ,, 11 | 412 | 444 | + 32 | 28 | 13,844 | + 529 |
| Isle of Thanet ..... | ,, 11 | 471 | 498 | + 25 | 1 | 872 | + 29 |
| Kilmarnock Corp. ..... | ,, 11 | 158 | 164 | + 6 | 21 | 3.876 | + 273 |
| Lanarkshire ..... | ,, 9 | 1,612 | 1,870 | + 258 | 40 | 68,111 | + 8,313 |
| Lancashire United ..... | ,, 8 | 1,390 | 1,650 | + 260 | 40 | 62.386 | + 7,207 |
| Leeds City ..... | ,, 11 | 7,790 | 8,167 | + 377 | 28 | 234,096 | + 15,555 |
| Leicester Corporation... | ,, 11 | 2,746 | 3,039 | + 293 | 41 | 114,817 | + 11,002 |
| Leith Corporation ..... | ,, 11 | 687 | 697 | + 10 | 21 | 15.828 | + 612 |
| Liverpool Corporation.. | ,, 11 | 11,982 | 12,941 | + 959 | 40½ | 526,157 | + 33,955 |
| Llandudno & Colwyn B. | ,, 10 | 230 | 246 | + 16 | 45 | 16,463 | + 1,409 |
| London County Council | ,, 8 | 40.959 | 43,145 | + 2,186 | 27 | 1,149.270 | — 10,134 |
| London Gnl. Omnibus.. | ,, 11 | 56,270 | 59,653 | + 3,383 | 41 | 2,549,899 | + 481,642 |
| London United ..... | ,, 10 | 5,871 | 6,215 | + 344 | 41 | 260,315 | + 3,752 |
| Lowestoft Corporation | ,, 11 | 189 | 203 | + 14 | 2 | 328 | — 1 |
| Maidstone Corporation | ,, 9 | 187 | 227 | + 40 | 28 | 5,988 | + 353 |
| Manchester Corp..... | ,, 11 | 16.991 | 17,591 | + 600 | 28 | 494,636 | + 25.187 |
| Met. Elec. Trys. ..... | ,, 10 | 8,451 | 9,056 | + 605 | 41 | 371,038 | + 11,666 |
| Nelson Corporation..... | ,, 11 | 201 | 194 | — 7 | 28 | 6,048 | + 376 |
| N'castle-on-Tyne Corp. | ,, 11 | 4,444 | 5,090 | + 646 | 28 | 135,464 | + 12,476 |
| Newport (Mon.) Corp.... | ,, 11 | 697 | 797 | + 100 | 28 | 21.629 | + 1,716 |
| New St. Helens & Dist... | ,, 8 | 742 | 807 | + 65 | 15 | 13,239 | + 1,551 |
| Northampton Corp ..... | ,, 10 | 523 | 569 | + 46 | 28 | 16,614 | + 1,149 |
| Nottingham Corp. ..... | ,, 9 | 3,963 | 4,296 | + 333 | 27½ | 93,475 | + 4,207 |
| Oldham Corporation ... | ,, 12 | 2,177 | 2,238 | + 61 | 29 | 61,339 | + 4,091 |
| Portsmouth Corp..... | ,, 11 | 2,029 | 2,164 | + 139 | 28 | 68,664 | + 3,917 |
| Preston Corporation ... | ,, 8 | 791 | 838 | + 47 | 28 | 25,071 | + 1,485 |
| Provincial ..... | ,, 11 | 1,829 | 1,835 | + 6 | 1 | 2,999 | + 239 |
| Reading Corporation ... | ,, 9 | 626 | 709 | + 83 | 27 | 19,491 | + 1,325 |
| Rochdale Corporation | ,, 11 | 1,571 | 1,588 | + 17 | 28 | 45,814 | + 1,765 |
| Rotherham Corp..... | ,, 15 | 916 | 1,046 | + 130 | 28 | 28,288 | + 7,093 |
| Salford Corporation ... | ,, 13 | 5,048 | 5,225 | + 177 | 28 | 147,938 | + 5,723 |
| Sheffield Corporation... | ,, 12 | 7,017 | 7,551 | + 534 | 29 | 210.467 | + 19,543 |
| Southampton Corp..... | ,, 8 | 1,195 | 1,402 | + 207 | 27 | 37,927 | + 2,121 |
| Southend-on-Sea Corp. | ,, 8 | 652 | 879 | + 217 | 28 | 30,062 | + 4,964 |
| South Met. Trys. ..... | ,, 10 | 839 | 1,067 | + 228 | 41 | 37.466 | + 2,545 |
| South Shields Corp..... | ,, 11 | 635 | 714 | + 79 | 28 | 20,732 | + 2,702 |
| Sunderland Corp..... | ,, 12 | 1.838 | 1.417 | + 79 | 28 | 41,667 | + 4.551 |
| Sunderland District ... | ,, 8 | 1,046 | 1,182 | + 136 | 49 | 27,641 | + 4,827 |
| Swindon Corporation ... | ,, 8 | 158 | 174 | + 16 | 27 | 4,688 | + 347 |
| Trys. (M.E.T.) 'Buses | ,, 11 | ... | 8,249 | ... | 37 | 180,042 | ... |
| TynesideTrys.&Tmrds | ,, 8 | 492 | 486 | — 6 | 15 | 7,949 | + 536 |
| Wallasey Corporation | ,, 11 | 1,052 | 1,129 | + 77 | 27 | 33.763 | + 3,316 |
| Walsall Corporation ... | ,, 11 | 590 | 624 | + 36 | 41 | 25,481 | + 1,797 |
| Walthamstow U.D.C.... | ,, 11 | 606 | 695 | + 89 | 28 | 21,472 | + 200 |
| Warrington Corp ..... | ,, 9 | 432 | 454 | + 22 | 28 | 12,318 | + 414 |
| West Ham Corporation | ,, 9 | 2,498 | 2,739 | + 241 | 27 | 75,666 | + 2,418 |
| Wigan Corporation ..... | ,, 9 | 1,360 | 1,506 | + 146 | 27½ | 40,871 | + 4,246 |
| Wolverhampton Corp | ,, 15 | 1,040 | 1,162 | + 82 | 29 | 31,335 | + 1,840 |
| Yorkshire (W. Riding | ,, 12 | 1,318 | 1,434 | + 116 | 41 | 59,544 | + 6,391 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,858 upon the week.

# ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Oct, 11 | £5,544 | £5,019 | — £525 | 41 | £196.774 | + £7,634 |
| City and South London | ,, 11 | 3,199 | 2,897 | — 302 | 41 | 113,952 | — 10,858 |
| Liverpool Overhead..... | ,, 12 | 1,586 | 1,643 | + 57 | 41 | 70,433 | + 5,400 |
| London Electric..... | ,, 11 | 14,380 | 13,715 | — 665 | 41 | 553,965 | + 1,905 |
| Mersey ..... | ,, 11 | 2,321 | 2,318 | — 3 | 41 | 91,628 | + 5,017 |
| Metropolitan ..... | ,, 12 | 17,019 | 17,954 | + 935 | 41 | 701,015 | + 19,558 |
| Metropolitan District... | ,, 11 | 13,402 | 13,107 | — 295 | 41 | 528,786 | + 17,612 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, October 17. | |
|---|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. ..... | — 3 | 70 — 75 | |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅛ — 4⅜ | |
| 5 | Do. 5½% Cum. 2nd Pref. ..... | ... | 4⅜ — 4⅝ | |
| 100 | Do. 4% Deb. Stk. Red..... | — 1 | 91 — 93 | |
| 100 | Do. 4½% Deb. Stk. Red..... | ... | 96½ — 98½ | |
| 100 | Do. 5% Deb. Stk. Red..... | ... | 98½ —100½ | |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 | |
| 1 | Bath Electric Tramways, Lim. Pref. Ord ..... | ... | ⅞ — 1 | |
| 1 | Do. 5% Cum. Pref ..... | ... | 21/32 — 23/32 | |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red..... | ... | 70 — 75 | |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 | |
| 10 | Blackpool and Fleetwood Tramroad Co. ..... | ... | 13½ — 14 | |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref.... | ... | 10¾ — 11⅛ | |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 | |
| $100 | Brazilian Traction Light and Power Co. Lim..... | — 1½ | 87 — 89 | |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. ..... | + ⅛ | 7¼ — 7½ | |
| 5 | Do. do. 5% Cum. Pref. ..... | + ⅛ | 5 — 5⅛ | |
| 100 | Do. do. 4½% 1st Deb Stock, Red. ... | ... | 99 —102 | |
| 10 | Bristol Tramways and Carriage Co. ..... | ... | 5¾ — 6¼ | |
| 10 | Do. do. 4% Cum. Pref. ..... | ... | 7 — 7⅛ | |
| 100 | Do. do. 4% Deb. Stock ..... | ... | 100 —102 | |
| 100 | Do. do. 4½% Deb. Stock ..... | ... | 95 — 97 | |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | ... | 121 —124 | |
| 100 | Do. Pref. Ord. Stock ..... | ... | 109 —113 | |
| 100 | Do. 5% Cum. Perpetual Pref. Stock..... | ... | 99 —102 | |
| 100 | Do. 4½% 1st Mort. Debs. ..... | — 3 | 97 —100 | xd |
| 40 | Do. 4½% Vancouver Power Debs. ..... | ... | 100 —104 | |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. ..... | ... | 89 — 92 | |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref..... | ... | 86 — 89 | |
| 100 | Do. 7% Non-Cum. Pref. ..... | ... | 50 — 53 | |
| 10 | Do. 6% Pref. Ord. Non-Cum. ..... | ... | 12½ — 14½ | |
| 100 | Do. Deferred Ord. Stock ..... | ... | 4 — 6 | |
| 100 | Do. 5% Perpetual Debenture Stock..... | — 1 | 91 — 94 | |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 76 — 79 | |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. ..... | ... | 87 — 91 | |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 | |
| 5 | Calcutta Tramways Co., Limited. Ord. ..... | + ... | 6 — 6½ | |
| 5 | Do do. 5% Cum. Pref. ..... | + ⅛ | 5 — 5¼ | |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 | |
| 1 | Cape Electric Tramways, Ld., ..... | ... | 11/16 — 12/16 | |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ | |
| 190 | Do. 5% Debs., Red. ..... | + 2½ | 90 — 93 | |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. ..... | — ⅛ | 5⅛ — 5⅜ | |
| 100 | Do. 4% Debenture Stock Red, 1985 ..... | ... | 92 — 97 | |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. .. | ... | 90½ — 94½ | |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 93½ — 95½ | |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ | |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. ..... | — ⅛ | — 10⅜ | |
| 10 | Do. do. 6% Pref. ..... | ... | — 11¾ | |
| 100 | Do. do. "A" Red. ..... | ... | — 82 | |
| 100 | Do. do. Deb. Stock "B" Red. ... | — ¾ | — 79 | |
| 10 | Gateshead & Dist. Trys. Co., Ord. ..... | ... | 8¾ — 9¼ | |
| 10/- | Hastings & Dist. Electric Trams. Co.. Ld., Ord. ..... | ... | 2/32 — 3/32 | |
| 1 | Do. do. 6% Cum. Pref. ..... | ... | ½ — ¾ | |
| 100 | Do. do 4½% Deb. Stk. Red. ..... | ... | 66 — 71 | |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds ..... | ... | 94½ — 98½ | |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)..... | ... | 87 — 92 | |
| 10 | Imperial Tramways, Ord. ..... | ... | 3½ — 4¼ | |
| 10 | Do. do. 6% Cum. Pref..... | ... | 6½ — 6¾ | |
| 100 | Do. do. 4½% Deb. Stock ..... | — ½ | 77½ — 78½ | |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.... | ... | 2 1/16 — 2 2/16 | |
| 100 | Do. 4% Debenture Stock ..... | ... | 73 — 78 | |
| 1 | Kalgoorlie Elec. Trams., Ltd. ..... | ... | 3/32 — 5/32 | |
| 100 | Do. do. 5% "A" Deb. Stk. ..... | ... | 85 — 90 | |
| 100 | Do. do. 6% "B" do. ..... | ... | 18 — 28 | |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref..... | ... | ⅞ — 1 | |
| 10 | Lanarkshire Tramways Co. ..... | ... | 9¾ — 10¼ | |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. ..... | ... | 77 — 81 | |
| 1 | Lisbon Electric Trams., Lim., Ord..... | ... | 1 — 1¼ | |
| 1 | Do. 6% Cum. Pref. ..... | ... | 1 1/16 — 1 3/16 | |
| 100 | Do. 5% Mort. Debs. ..... | ... | 91 — 96 | |
| 1 | London and Suburban Trac. Co., Lim., Ord. ..... | ... | ¼ — ⅜ | |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | — 1 | 95 — 97 | |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 | |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 60 — 64 | |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 | |
| 5 | Do. do. 6% Cum. Pref..... | + ⅛ | 4¾ — 5⅛ | |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. ..... | ... | 87 — 89 | |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | — 1 | 108 —111 | |
| $1,000 | Do. do. 5% Bds. ..... | ... | 97 — 99 | |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. ..... | ... | 32/32 — 1 1/32 | |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ... | ... | 82 — 86 | |
| 100 | Do. 5% Deb. Stock, Red. ... | ... | 86 — 89 | xd |
| $100 | Mexico Tramways Co., Common Stock ..... | — 2½ | 83 — 86 | |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 5 | 84 — 87 | |
| 100 | Do. 6% 50-yr. Mort. Bonds ..... | — ½ | 90 — 93 | |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds ... | ... | 93 — 95 | |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922)..... | ... | 97 — 99 | |
| 100 | Do. 4½% Sterling Debs, (1923) ... | ... | 98 —100 | |
| 1 | National Steam Car Co. Ltd ..... | ... | 1 1/16 — 1 3/16 | |
| 10 | Oldham—Ashton and Hyde Elec. Ord. ..... | ... | 6½ — 6⅝ | |
| 10 | Do. do. 5% Cum. Pref. ..... | ... | 5 5/16 — 6⅛ | |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. ..... | ... | 5 5/16 — 6⅜ | |
| 5 | Do. do. 6% Cum. Pref. ..... | ... | 4¾ — 5⅛ | |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord..... | ... | 1 3/16 — 1¾ | |
| 1 | Potteries Electric Traction Co., Ltd., Ord. ..... | + 1/32 | 7/16 — 9/16 | |
| 1 | Do. 5% Cum. Pref. ..... | ... | 9/16 — 11/16 | |
| 130 | Do. 4½% Debenture Stock, Red. ..... | ... | 82 — 85 | |
| 1 | Provincial Tramways, Lim., Ord. ..... | ... | 21/32 — 23/32 | |
| 10 | Do. 5% 1st Deb. Stock ..... | ... | 97⅛ —100⅛ | |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5 %... | ... | 84 — 87 | |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref..... | ... | 5 — 5⅛ | |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 95 — 97 | |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. ..... | ... | 83 — 85 | |
| $100 | Rio de Janeiro Tramway Light and Power Co. ..... | ... | — | |
| $500 | 1st Mt. 30-yr 5% Gold Bonds ..... | ... | 98¼ —100⅛ | |
| 100 | 5% 50-yr. Mort. Gold Bonds ..... | ... | 88⅛ — 90⅛ | |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | + 2 | 100 —103 | |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 ..... | — 1 | 98 —101 | |
| 10 | Shanghai Elec. Construction Co. ..... | + 1¼ | 10⅛ — 11⅛ | |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red ..... | ... | 86 — 90 | |
| 100 | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ... | ... | 5/16 — ⅜ | |
| | Do. do. 4% Deb. Stk..... | ... | 68 — 72 | |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. .... | ... | 93 — 95 | |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds ..... | ... | 97 — 99 | |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 87 — 89 | |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | — 2½ | 87½ — 90½ | xd |
| 5 | United Elec. Tramways of Monte Video, Ord..... | + ⅛ | 4¾ — 5⅛ | |
| 5 | Do. do. 6% Cum. Pref..... | + 1/8 | 4⅞ — 5⅛ | |
| 100 | Do. do. 5% 1st Deb. Stk. Red. ..... | ... | 97 —100 | |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. ..... | ... | 98½ —100¼ | |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. ..... | ... | ¼ — ⅜ | |
| 5 | Do. do. 6% Cum. Pref..... | ... | 3⅜ — 3¾ | |
| 100 | Do. do. 4½% 1st Deb. Stock. Red..... | ... | 81 — 85 | |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 21. ] LONDON, SATURDAY, OCTOBER 25, 1913. [ Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### BOMBAY, BARODA, AND CENTRAL INDIA RAILWAY.

The Directors are prepared to receive up to noon on Tuesday, November 11, tenders for the supply of :—

CLASS A.

(1) Steel Tyres for Carriages and Wagons.
(2) Wheels and Axles.

CLASS B.

(1) Axles for Carriages and Wagons.

Tenders must be made on forms, copies of which, with specifications, can be obtained at these offices on payment as follows :—

For Class A, 20s. each; and for Class B, 10s. each (which will not be returned).

The Directors do not bind themselves to accept the lowest or any tender.

C. CROMMELIN,
Secretary.

Offices : Gloucester House,
110, Bishopsgate, London, E.C.,
October 23, 1913.

### BOURNEMOUTH CORPORATION TRAMWAYS.

The Tramways Committee of the County Borough of Bournemouth are prepared to receive tenders not later than November 17, 1913, for :—

Supply and Delivery of 10 Bogie Electric Tramcars.

Specifications, conditions, drawings, and forms of tender may be obtained on application to the undersigned on payment of a deposit of £2, which will not be returned except on receipt of a *bonâ-fide* tender.

Additional copies may be had on payment of £1 1s. each, which will not be returned.

The Committee do not bind themselves to accept the lowest or any tender.

I. BULFIN, B.A., A.M.I.C.E., M.I.M.E., M.I.E.E.,
General Manager

Tramways Offices, Bournemouth.

### WALSALL CORPORATION TRAMWAYS.

TICKETS AND TICKET REGISTERING PUNCHES.

The Corporation of Walsall invite tenders for the supply to the Tramways Department of Passenger Fare Tickets, with advertising rights; and Ticket Registering Punches (on hire), from January 1, 1914.

Copies of specification, general conditions, and form of tender may be obtained on application at the General Manager's Office, Birchills Depôt, Walsall.

Tenders, sealed and endorsed "Tender for Tickets and Punches," must be delivered to the undersigned on or before Saturday, November 15.

The Corporation do not bind themselves to accept the lowest or any tender, and they will not accept the tender of any firm or person paying their workmen less than the standard rate of wages.

(Sgd.) R. L. HORSFIELD,
General Manager.

Birchills Depôt, Walsall,
October 21, 1913.

### CORPORATION OF LEICESTER.

ELECTRIC TRAMWAYS.

The Tramways and Electricity Committee of the Leicester Town Council are prepared to receive tenders for the supply and delivery of 190 tons of Steel Girder Tramway Rails and Fishplates.

Copies of the conditions of contract, specification, and form of tender may be obtained at my office on and after Friday, October 24, 1913, on payment of the sum of £1, which sum will be returned on receipt of a *bonâ-fide* tender.

Cheques, etc., must be crossed and made payable to the Leicester Corporation.

Sealed tenders, on the forms supplied, must be returned intact, and with all blanks filled up, addressed to the Chairman of the Tramways and Electricity Committee, Town Hall, Leicester, and must be delivered not later than noon on Monday, November 3, 1913, endorsed "Tender for Rails, etc."

The Committee do not bind themselves to accept the lowest or any tender.

E. GEO. MAWBEY, M.Inst.C.E.,
Borough Engineer, Leicester.

Town Hall, Leicester,
October 21, 1913.

### COUNTY BOROUGH OF WOLVERHAMPTON.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply, delivery, and erection of

One 4,000 kw. Turbo-Alternator, Condensing Plant, and Auxiliaries.

Specifications and form of tender may be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained upon payment of five shillings for each copy.

Tenders, addressed to the undersigned, must be sealed with wax and endorsed "Tender for Turbo-Alternator," and delivered not later than noon on Monday, November 9, 1913.

The lowest or any tender will not necessarily be accepted.

S. T. ALLEN,
Chief Engineer and General Manager.

Electricity Offices,
Commercial Road, Wolverhampton,
October 22, 1913.

### BOROUGH OF BEDFORD.

ELECTRICITY DEPARTMENT.

The Corporation of Bedford invite tenders from manufacturers for the following Machinery :—

Contract No.
1. 1,000-Kilowatt Mixed-Pressure Turbo-Alternator with Exciter and Condensing Plant.

Contract No.
2. 1 Water-Tube Boiler with Mechanical Stoker and Coal-Handling Plant.

Copies of the drawings, specifications, and general conditions may be obtained from the undersigned. The sum of £1 must be deposited for each specification in the first instance, which will be returned on receipt of a *bonâ-fide* tender. Subsequent copies will be supplied at the rate of 5 shillings each.

Sealed tenders, endorsed with the Contract No., to be delivered not later than noon on the 12th day of November, 1913, addressed to the Chairman of the Electricity Committee, Electricity Works, Cauldwell Road, Bedford.

The Corporation does not bind itself to accept the lowest or any tender.

R. W. L. PHILLIPS,
Borough Electrical Engineer.

Electricity Works,
Cauldwell Road, Bedford,
October, 1913.

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## NOTICE.

CONSTRUCTION AND EXPLOITATION OF A RAILWAY.

The "Junta Geral" of the District of Ponta Delgada, Saint Michael's, Azores, represented by its Administrative Committee, makes known that, being duly authorised by the Law of the 20th June, 1913, published in the *Diario do Governo* (Official Gazette) of the Portuguese Republic, No. 140, of the 28th of that month, it will open a Competition for a period of ninety days, to run from the first publication of the aforesaid *Diario*, for the Construction and Exploitation of an Electric Railway, to be laid, as far as may be possible, on the sideways, roadways, and beds of the national and municipal highways between Ponta Delgada and the valley of the Furnas, and Ponta Delgada and the town of Ribeira Grande. The bases of the contract and the respective programme and conditions will be on view at

"The Portuguese Consulate" in London and at Messrs. Wm. Hooton and Yates, 12, Fenchurch Street, E.C.,

where all explanations will be given, only the Portuguese version published in the *Diario do Governo* being valid for all effects.

Secretariate of the Junta Geral of the District of Ponta Delgada, Saint Michael's, Azores.—30th September, 1913. The Administrative Committee.—Manuel Jacintho da Ponte, President.—Filigenio Pimentel, Vice-President.—Joao Candido Borges.—Antonio Joaquin Fernandes.—Members.

## WALTHAMSTOW URBAN DISTRICT COUNCIL.

ADVERTISING ON ELECTRIC TRAMCARS.

The Council invite tenders for the sole right of Advertising upon their Thirty-eight Electric Tramcars for alternative periods of three or five years, commencing on the 15th January, 1914.

Specification and form of tender may be obtained on application to the Tramways Manager, Car Depôt, Chingford Road, Walthamstow, and any information required obtained from him as to the car service and form of contract, etc.

Sealed tenders, endorsed "Advertisements on Tramcars," addressed to the undersigned, must be delivered by post only not later than 12 o'clock noon on Wednesday, the 12th day of November, 1913, at the Clerk's Office, Town Hall, Walthamstow.

The Council do not bind themselves to accept the highest or any tender.

C. Sydney Watson,
Clerk to the Council.

Town Hall, Walthamstow,
October 21, 1913.

(*Continued on page* 387.)

Advertiser wishes to dispose of his copies of the illustrated issues of Tramway and Railway World from August, 1904, to September, 1909; perfect condition. Box 61, Tramway and Railway World, Amberley House, Norfolk Street, W.C.

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THE
# Tramway and Railway World

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SATURDAY, OCTOBER 25, 1913.

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## MOTOR TRAFFIC AND ROAD MAINTENANCE.

At the recent conference of the Municipal Tramways Association a great deal was said on the increasing cost of maintaining the paving of tramway tracks owing to the development of heavy motor vehicle traffic. But there is another part of the subject to which the attention of road authorities throughout the country is being increasingly turned, and that is paving and maintenance of roads used by heavy motor vehicles in places where there are no tramways. An important branch of this subject, so far as the metropolis is concerned, is raised in a report by the Finance Committee of the London County Council presented to the Council this week. It is the custom of the Metropolitan Borough Councils to raise loans for carrying out the work of road paving, or extraordinary maintenance, so far as the cost cannot be provided for out of current revenue from the rates. The County Council have to sanction all these loans, and their practice has been—and in this they have the concurrence of the Borough Councils—to discourage loans as much as possible and to have road paving paid for directly out of the rates. The result was that the amounts of loans sanctioned for some years showed a decline, till recently when they have shown a large increase. The following figures give the amounts of loans sanctioned for paving works in the years mentioned:—

| | | | |
|---|---|---|---|
| 1905-6 ... ... ... | £181,200 | 1912-3 ... ... ... | £103,638 |
| 1911-2 ... ... ... | 40,808 | 1913-4 (about 6 months) | 200,035 |

The last figure is for the current year up to the present, which may be taken as about six months. The Finance Committee point out that the great increase has arisen from the development of heavy motor traffic, which means in London for the most part motor omnibuses. This vehicle, it is pointed out, destroys the best macadam roads, and makes it necessary in some cases to strengthen the foundations of roads which have already been paved. Then there is the difficulty that there is no authority which can exercise any control over the routes used by heavy motor traffic. All streets are open to it, and if a line of omnibuses is started along a route where the streets are not constructed to carry such traffic, heavy expenditure on paving becomes necessary. It will thus be seen that there are enormous possibilities of paving expenditure, because the omnibus routes can be changed as often and as much as may be deemed necessary. This is an alarming state of things for the ratepayers. The Finance Committee make the very reasonable suggestion that if certain forms of traffic demand special road construction, they should be limited to specified routes on which suitable paving should be laid. In the Committee's opinion the present state of affairs points to the necessity for control by some authority over the route to be taken by such traffic. They, however, add, apparently in despair, that nothing can be done in this direction without an alteration of the law. There may well be some despair, seeing that it is now eight years since the Royal Commission on London Traffic recommended the formation of a Traffic Board, and nothing whatever has been done by the Government to carry out that proposal. The London trouble is already spreading to the provinces. The road authorities in South Lancashire and some other districts already know of the special expense caused by motor lorries. As to omnibuses, where a local authority seeks to run these outside its own boundaries Parliamentary powers have to be obtained, and these are now coupled with a stipulation for contributions to road maintenance. But companies require no such authority to run omnibuses in country districts, and they are not called on to pay for road maintenance, though the rural roads are not fitted to withstand the traffic. The county engineer of Middlesex stated the other day that the cost of maintaining some of the roads in that county is now about three times the average of a few years ago. As another example, the omnibuses are now beginning to pervade the rural roads in the county of Surrey. These highways will need reconstruction. The same thing may be anticipated elsewhere. The case of London may require separate legislation, but a new law is required for the whole country which will put a charge for the roads on all heavy vehicles plying for profit.

## TRACK DOUBLING AND IMPROVEMENTS IN LAY-OUT.

For a number of reasons it has become desirable that in towns consideration should be given to the questions of converting single lines into a double set of rails, and also of improving the lay-out where points and crossings exist. The former desideratum has been recognised in several of the outer London municipalities and urban districts where single lines entail loss in a double sense, owing to motor omnibus rivalry. Although provincial tramways have not this incentive to effect the improvement, it is satisfactory to find that there are a number of undertakings where doubling has been decided upon. A notable instance is Cardiff, where Sir John Courtis has recently defended the action of the management in undertaking the work in order to relieve congestion and to increase the facilities offered to the travelling public. Sir John added that there were many places in the city where the need exists, and in the course of the discussion it

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transpired that negotiations are in progress to secure the land required, so that another length of track may be duplicated. Possibly no great length of time will elapse before provincial tramways owners will have to consider applications for licenses from omnibus proprietors. One journal devoted solely to the interests of the latter form of traction has boasted that in the near future the question of the right of local authorities to entirely exclude the competing vehicles may be tested in the Courts. It does not need a great amount of prescience to understand that there is a possibility of such a thing occurring, for now that the needs of the Metropolis have been fully met as regards the number of omnibuses, the manufacturing interests allied with the two chief operating companies will need other outlets for their machines. As we have before suggested, it rests with tramways undertakings to forestall would-be competitors by making use of the railless trolley car or the motor omnibus. Indications are not wanting to show that a record number of applications will be made to Parliament next session not only for motor omnibus powers, but for authority to work the two classes of vehicle, for it is now widely recognised that the petrol car may be advantageously used for testing routes before equipping them with overhead wires. Reverting to track doubling, the city of Norwich may be instanced as another place where the tramways management is animated by adequate recognition of present-day requirements. Not only are double lines being laid down, but the general situation has been reviewed as regards the lay-out in connection with the renewal of points and crossings. Mr. F. W. Ketley, the manager and engineer, has rightly stated that this is necessary for the purpose of meeting the altered traffic conditions brought about by motor traffic. He has further stated that at the present rate of increase of speed effected by mechanical traction, the tramcar will soon be among the slowest unless powers for speeding up are granted. Undoubtedly, the policy which he is carrying out is a necessary preliminary in a number of towns before applying for authority to run the cars at higher speeds. As an incentive to other authorities to increase the efficiency of their services, we may mention that Southampton has just obtained authority to run at ten miles per hour, instead of eight miles, on several sections. Not the least important improvement resulting from track doubling will be the lessening of the risk of collision and also of cars jumping the rails at loops through motormen neglecting to decrease speed, especially at night, on badly-lighted routes. To the numerous mishaps that have occurred on single lines a serious addition was made on Saturday last, during a fog, on the Tyneside Company's system, when a motorman and a conductor were killed and five other men on a repair wagon injured. On the Ayr tramways two motormen and a passenger were recently injured in a collision on a single line. The London County tramways are not free from the risk of similar accidents. In one busy suburb, where the unreasonable demands of property owners have led to single line construction until such time as their leases run out, the cars shoot several yards across the street, in which there is an omnibus service at two-minute intervals, while at one end of the single line another 'bus service turns at right angles on a gradient and crosses a junction of a double tramway line. The single line, too, is laid on the main London-Brighton road, which is used by hundreds of motor cars.

## MOTOR OMNIBUSES AND TRAMCARS.

Some interesting particulars were given at Tuesday's meeting of the London County Council as to cases brought against drivers of motor omnibuses. On July 16 last the driver of an omnibus pulled up at New Cross Gate in such a manner as to obstruct the whole of the conductor's platform of one of the Council's cars, thus preventing passengers getting in or out without great difficulty. A summons was taken out against this driver for interfering with the traffic on a tramway, and the case was heard on August 21 at Greenwich Police Court, when the magistrate imposed a fine of 2s. and 10s. 6d. costs. The magistrate remarked that he had taken into consideration the defendant's statement that he had been put to considerable expense over the case, and had only just got work, and stated further that the next man summoned for such an offence would be fined the full penalty, as he had had "personal experience of the way the 'buses behaved to tramcars."

Another similar case occurred on June 19, when one of the Council's tramcars was standing at the terminus in Scrubs Lane. About 30 passengers were in the roadway preparing to board the car, when a motor omnibus travelling at eight miles an hour was driven down the road and came to a standstill just in front of the car, the persons intending to board the car being scattered in all directions. The defendant, on being remonstrated with by a traffic regulator, became abusive. A summons was taken out against the driver for reckless driving, and at West London Police Court on July 18 the magistrate came to the conclusion that the driver had driven dangerously, and imposed a fine of 20s. and 12s. 6d. costs.

On July 4 a motor omnibus driven at the rate of 14 miles an hour overtook a car in Fulham Palace Road, and passed on the off-side. When the front of the omnibus was hardly halfway past the car the driver turned sharp to the near side and cut in front of the tramcar. The driver of the car applied the magnetic brake immediately to avoid a collision, the result being that the passengers in the tramcar were severely shaken. A summons was issued against the driver, which was heard at West London Police Court on August 1, and the magistrate convicted the defendant of reckless driving, and imposed a fine of 30s. and 12s. costs.

The second and third summonses were taken out under the Motor Car Act, 1903.

## MUNICIPAL MOTOR OMNIBUS PROPOSALS.

Crewe.—The proposal of the Corporation to obtain Parliamentary powers to run motor omnibuses has been rescinded at a special meeting by 25 votes to eight, the question being referred back to the committee for further consideration. This will involve a delay of twelve months in the application to Parliament.

Manchester.—The Tramways Committee intend to seek powers to run omnibuses in districts outside the city where tramways are either owned or leased by the Corporation, or over which that authority have running powers.

Newcastle-on-Tyne.—On October 20 the Corporation adopted a recommendation by the Tramways Committee to apply for powers to extend the tramways to Longbenton, outside the city, and to run motor omnibuses in the Longbenton Council's area, which has a population of 16,000. Councillor Rodgers mentioned that the Benton boundary tramway extension increased the receipts by £80 a week and the Elswick extension to Chillingham Road increased the receipts from £280 to £555 per week. The motor 'buses to Westerhope now carried the population of the village two and-a-half times a week. So far as Lemington was concerned, they were carrying over 12,000 a week—the population three times over. The Westerhope 'buses were paying, and, moreover, they were feeding the cars to the tune of £20 a week.

West Bridgford.—Five omnibuses are to be purchased at a cost of £3,050 by the Urban District Council, the chassis being of Dennis manufacture and the bodies of the Allen type, which was illustrated in The Tramway and Railway World of July 10 last. The garage is to cost £1,589, and the service is expected to be inaugurated before Christmas.

## L.C.C. TRAMWAY MATTERS.

RETURN FARES.

At last Tuesday's meeting of London County Council the Highways Committee reported on the subject of return fares on the tramways. In the first place they stated that they arranged for the institution of 3d. single and 5d. return fares for maximum distances on a number of the routes south of the Thames. In regard to the results obtained from the return fares already in operation on the southern lines the Committee reported that there had been a rapid increase since the inauguration of these fares in July, 1912, in the number of return tickets sold, that this increase still continued, and that a very large number of high-priced tickets were being issued, indicating that the travelling public were prepared to ride long distances by tramcar. There had also been a marked increase in the total number of passengers carried since February last, when return tickets between intermediate points on various routes came into operation.

In regard to return fares on the northern lines, it appeared that since the introduction of 4d. circular return tickets there has been a very large increase per cent. in the weekly average number of tickets sold.

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PAY OF REGULATORS AND INSPECTORS.

The Council on March 28, 1899, fixed the rate of pay of traffic regulators and ticket inspectors at £2 2s. a week. At that time the tramways were worked by horse traction, and in view of the fact that the work of some of these men had increased, the Committee were of opinion that the maximum rate of pay should be increased to £2 5s. a week. The estimated cost of giving effect to the proposal was about £250 a year.

CHAIN GRATE LINKS.

The Committee reported that the Brightside Foundry and Engineering Company, Sheffield, the contractors for 1912-13 for the supply of chain grate stoker links for use with the boilers at Greenwich generating station were compelled, owing to pressure of work, to sublet part of the contract. Large quantities of the castings supplied by the sub-contractors were however unsuitable and were rejected, and the Committee therefore arranged for the supply from the makers of the boilers, Babcock and Wilcox, of 5,000 links at £18 12s. a thousand, and 5,000 links at £28 a thousand.

A GENERAL SURVEY.

Mr. Cyril Cobb, chairman of the Council, in the course of the annual address from the chair, said in reference to the Council's tramways that they carried no less than 512,052,053 passengers during the year ended March 31 last, while the income amounted to £2,251,729. Powers were obtained in 1912 to use trailer cars and to run cars for special purposes. At the end of the year arrangements were made for the distribution free of charge of a small folded route map with diagrams of the tramways with the number of each route. The system of return fares which was in operation for some years on routes north of the Thames had also been applied to certain routes on the south side of the river. An important scheme had been approved, and was now in hand for increasing the power capacity at the Greenwich generating station, by substituting turbine engines for the reciprocating plant. He also referred to the inquiry taking place by a Special Committee as to the supply of electricity in London.

## MISCELLANEOUS NEWS AND NOTES.

**Trail Cars for Bolton.**—Power to run trail and coupled cars is being applied for by the Corporation. Five tramway extensions are also proposed.

**Removal of Central Standards.**—As a first instalment of a promise made to motorists, the Darlington tramways department are removing the centre standards in the narrower thoroughfares.

**Rawtenstall Generating Station to be Extended.**—The Corporation have decided to make application to the Local Government Board for sanction to the borrowing of £10,000 for extensions required at the electricity works at Harcholme.

**Standard for Fishplates.**—The Engineering Standards Committee has issued a British standard specification for steel fishbolts and nuts for railway rails. The specification prescribes the quality of the steel and the tests, but does not deal with the system of design.

**The Proposed P.A.Y.E. Extension at Leicester.**—The Tramways Committee have ordered ten new top-covered cars which are to be so constructed as to be capable of being operated on the P.A.Y.E. system in the event of the Town Council deciding to add to the number of such cars now in use.

**Manchester Tramways Improvement Scheme.**—Manchester Corporation have under consideration a scheme to enable the running of a double line of tramways right across Cross Street into Albert Square, thereby relieving the present congestion of traffic in the bottle-neck leading to the Square. This improvement involves the purchase of property valued at £80,000.

**Enforcing Tramcar By-Laws.**—During the past quarter inspectors in plain clothes have been engaged in travelling on the Glasgow tramcars, with a view to detecting contraventions of the by-laws. Between July 25 and October 11 they noted 223 cases of spitting on cars, and also a large number of cases of children hanging on to the rear of the cars. In all, no fewer than 848 offences of various kinds have been booked.

**Curtailment of Police Passes.**—It was reported at the October meeting of West Hartlepool Council that the passes to the police on the tramcars would in future be restricted to the superintendent of the police, two inspectors, four detectives, and any other approved case. The privilege of riding free had, it was said, been very greatly abused to the detriment of the ordinary passengers and also to the finances of the Corporation.

**Farm Produce per Tramcar.**—In connection with an agitation for a railway from Stourbridge to the village of Kinver, it is pointed out that partly as a result of the agitation a tramway line has been laid from Amblecote and Stourbridge to Kinver, and has been largely instrumental in Kinver's later development. On the whole the cars have served the district well; but there are certain disadvantages which, as local people say, include a lack of adequate facilities for the transport of farm and garden produce.

**Vehicle Workers to Consider Amalgamation.**—To draft a scheme for the amalgamation of all the vehicle workers' unions in the United Kingdom, a conference was held at Leicester on October 23. Six unions had agreed to send representatives—viz., the Cabmen's Union, the Vehicle Workers' Union, the Amalgamated Tramway and Vehicle Workers' Union, the United Carters of England, Bolton Lorrymen's Union, and the Liverpool Carters' Union. These unions have about 500,000 members. The proceedings were adjourned for the consideration of various schemes.

**Birmingham and Telephone Wires.**—A settlement was arrived at on October 9 in the test case before the stipendiary magistrate on the proposal of the Post Office to erect overhead wires in 19 suburban roads. The agreement was that in five of the roads the Postmaster-General would place the wires underground, in one road a special description of pole would be erected, and in the remaining roads ornamental wooden poles would be placed.

**Car Cleaners Ask for Two Free Nights.**—A committee has been formed among the car cleaners at Birmingham to place before the Tramways Committee a request for the following concessions:—Increased pay for both night and day cleaners, on the present scale of 26s., which rises in two years to 28s.; more cleaning to be done during the day; the provision of overalls; and two nights off a week in succession. As the men work during the night preceding their day off they need to go to bed in the daytime, and cannot stop up all the night that they are free from duty.

**Scheme to End the Sheffield Difference.**—The Tramways Committee have adopted a recommendation made by the general manager for time-and-a-half rate of pay to be given for all Sunday work to all employees who have completed five years' service who are not at present in receipt of time-and-a-half or a higher rate for such work. All employees now get time-and-a-quarter, which was granted in July, 1906, at a cost of £2,028 per annum. The new concession will cost £540 a year, and Mr. Fearnley states that if it is granted a number of applications which he had received for increases in wages may be considered disposed of. The committee's report was adopted by the City Council on October 22.

**The Suggested Rating of Motor Omnibuses.**—St. Pancras Borough Council on October 8 decided to take no action in response to a communication asking them to support a suggestion for enabling any rating authority in the metropolis to charge and recover from Side Tramways Company's system. The cars met on the same line, pound on the annual value of the undertaking in such area as should equal the amount of the general rate imposed. Councillor Harley, who supported the suggestion, said that of ninety miles of road in that borough eleven were used by motor omnibuses, over which 7,000 'bus journeys were made per day with a 'bus mileage of 101 per day, or the enormous total of three and a half millions per year.

**Two Fatalities in a Tyneside Collision.**—During a fog at 7 a.m. on October 18 a repair wagon and an empty car known as the "pitmen's special" collided head on while going at a speed of about ten miles an hour from Gosforth to Wallsend on the Tyneside Tramways Company's system. The cars met on the same line, the men on the wagon expecting that the car would be stopped at a loop waiting for them. The crew of the car, however, would not expect the wagon as it does not run to time. The conductor of the car who had been on the motorman's platform helping to keep a look-out, died in a doctor's surgery, and the motorman expired in hospital the same night. The motorman of the wagon and five permanent way men were injured. The inquests have been adjourned.

**Increasing Demands of Local Authorities.**—A sub-committee of the Renfrew, Lanark, and Dumbarton County Councils have been appointed to confer with representatives of Glasgow in order, if possible, to make an arrangement applicable to all the areas concerned regarding the conditions under which the tramways should be extended outside the city boundaries. In a tramway extension scheme now proposed the County Councils stipulate that all widenings of roads or formation of new roads should be carried out entirely at the expense of the Corporation. Hitherto no wayleaves have been received from the Corporation, who are bound to maintain only the roadways between their tramway rails and 18in. on either side. The County Councils think that the responsibility of the City Council for maintenance should extend further.

**Motorists and London Motor Traffic.**—The Hon. Arthur Stanley, M.P., presided at the October meeting of the Committee of the Royal Automobile Club when Captain Deasy, who gave evidence before the Select Committee on London Motor Traffic on behalf of the Royal Automobile Club and the Roads Improvement Association, submitted a criticism on the report. A long discussion ensued, with the result that the Committee will be specially called at an early date to further consider this important matter. The Chairman pointed out the vital importance to all users of the road of seizing the present opportunity to make a well-considered effort to obtain by legislation proper regulations for motor traffic under a proper authority. He proposed to apply for a meeting of the National Automobile Council at a later date to consider the proposals which would be put forward by the club.

**New South Wales Tramways.**—The report of the Tramways Department for the year ended June 30 last states that the rolling stock consisted of 20 steam motors, 70 steam cars, 1,182 electric motor and 38 trailer cars, and 95 service and other vehicles. The total electric current output for the year at the Ultimo Power House was 89,113,030 kilowatt hours, of which the alternating current supply was 78,090,695 kilowatt hours, and the direct current 11,022,341. Eight and a half miles of track were treated for corrugations with the Carborundum rail grinder. On June 30 there were 207¾ miles opened for traffic, 12½ miles having been opened during the year. The total capital expenditure on lines open for traffic amounts to £6,699,305. Seventy-two fronts of cars were enclosed with glass work. The tramways staff numbers 9,170, and during the year the value of the concessions and advances made to the tramways staff, all grades, equalled £282,230 per annum.

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**Reduced Tramway Assessments on Account of Competition.**—In response to an application made by the London County Council for a reduction in the assessment of their tramways track to the rates in Lewisham, owing to the falling off in the traffic receipts due to motor 'bus competition, the local Council have reduced the assessment from £9,080 to £5,500. As a consequence the loss to the rates will have to be made up by the ratepayers. On the presumption that the assessments in the other tramway boroughs will be reduced in the same proportion, the £100,000 which the municipal tramway undertaking pays will be reduced to £65,000. This will mean that the 2d. in the pound paid by the tramways to the reduction of their rates will be reduced by about a third of a penny. In addition the ratepayers in nearly every London borough are being called upon to bear the cost of making the roads suitable for motor 'bus traffic. In Wandsworth as a first instalment £20,000 is being expended in paving roads with wood blocks placed on a 9in. foundation of cement. The rate for the current half-year has been increased by twopence.

## CONTRACTS AND ORDERS.

**Chamberlain and Hookham, Limited,** have a contract from Cleethorpes Urban District Council for prepayment meters.

**The "M. and G." Truck and Engineering Company, Limited,** have secured from Aberdeen Corporation the contract for six trucks of their rigid wheel base, 21 E.M. type.

**The Canadian General Electric Company** have secured the contract for the electrification of the Mount Royal Tunnel of the Canadian Northern Railway, which is to open up the suburbs of Montreal.

**Walthamstow Council** have accepted the tender of J. Baker and Co. for a supply of a dozen special tramcar axles at £3 3s. per axle, and that of W. T. Henley's Telegraph Works, Limited, for a supply of feeder cable.

**Clough, Smith and Company, Limited,** Spencer House, South Place, London, E.C., have secured from Keighley Corporation the contract for the erection of the 6,600 volt high tension transmission line between Keighley and Bingley.

**Bradford Tramways Committee** have accepted tenders submitted by F. Parker and Co., Manchester, Beecroft and Wightman, Limited, Bradford, and J. Rhodes and Co., Limited, Bradford, for supplies of timber for tramcar bodies.

**The Great Western Railway** have placed an order with the Railway Track Supply Company (of Great Britain), 81, Gracechurch Street, London, E.C., for one Buckwalter electric industrial truck, for use at their Swindon works. This, we believe, is the first truck of its kind ordered for use in Great Britain. The manufacturers of the Buckwalter trucks have standardised four types of trucks for railway platforms, locomotive machine shops, docks, etc. Further particulars can be obtained from the Railway Track Supply Company on application.

## PERSONAL.

**Mr. Whitaker Thompson,** who has been chairman of the London County Council, has been adopted as the prospective Unionist candidate for East Bradford.

**Mr. Arthur Kenworthy,** chief electrical engineer to Barnsley and District Electric Traction Company, was married to Miss Morris, at Barnsley, on October 22.

**Mr. A. M. B. Grahame** was appointed managing director of Hurst, Nelson and Co. at the annual meeting of the shareholders in the place of the late Mr. Andrew S. Nelson. Mr. Geo. W. Chalmers was appointed works manager.

**Mr. H. E. Blain,** vice-president of the National Association of Local Government Officers, was presented at the annual dinner with a gold watch and chain and a silver tray in recognition of the part he took in forming the Association.

**Mr. E. J. Doran,** after acting for six months as assistant tramway traffic superintendent of the New South Wales tramways at Sydney, during the absence of Mr. H. F. Brown, on leave of absence prior to retirement, has received the permanent appointment to that position.

**Sir John Courtis,** chairman of Cardiff Tramways Committee, speaking at a luncheon given in connection with the acquisition of Grove House by the Corporation, remarked that he had returned from his Canadian tour with big ideas, after seeing some of the cities there, as to what Cardiff should do.

**Councillor Hargreaves,** J.P., vice-chairman of Hull Tramways Committee, has accepted an invitation to become Mayor of the city. Mr. and Mrs. Hargreaves recently opened a bazaar at which £120 was raised for the Tramways Band, and they were congratulated by Mr. W. J. McCombe, the manager, on the honour about to be conferred upon them by the Corporation.

**Mr. A. H. Stanley,** the managing director of Central London Railway Company, City and South London Railway Company, London Electric Railway Company, London General Omnibus Company, Metropolitan District Railway Company, and Underground Electric Railways Company, of London, is referred to as follows in the current issue of the house magazine of Scholey and Company, 151, Queen Victoria Street:—"Mr. Stanley, who has become an outstanding figure in the regeneration of London traffic facilities, while of English birth, received his training wholly in the United States. Prior to his appointment to the London underground systems he was general manager of the Public Service Corporation of New Jersey. He has brought to his high office a remarkable knowledge of all questions associated with traffic, and he has grasped the essential truth that if you go the right way to work to help the public, the public will reciprocate, and hence it follows that the smoothness and celerity with which the London Underground Railway operates is due to two factors: the amazing improvement in the service and the splendid co-operation of the public. To have secured either of these meant much; to have accomplished both suggests an intuition and a deep-seated knowledge of traffic and people which is as remarkable as it is rare."

**Mr. A. L. C. Fell,** chief officer of the London County Council tramways, is the president of the minstrel troupe composed of employees of the department. With the proceeds of entertainments given by the troupe, "L.C.C. Tramwaymen's Cots" are endowed at various hospitals, the latest being at the Belgrave Hospital for Children. Each month a collection is made at all the depôts for the maintenance of the troupe, who would otherwise be rather seriously out of pocket in purchasing music, in the buying and upkeep of instruments, and in fares. The enthusiasm of the minstrels is shown by the case of one member living at New Cross, who must start his daily work at 4 a.m. in order to finish at 6 p.m. to attend the practice at Hackney.

## FINANCIAL REPORTS AND MEETINGS.

**Brazilian Traction, Light and Power.**—The directors have declared a dividend of 1½ per cent. on the issued ordinary capital stock.

**Hong Kong Tramway Company.**—The board announce an interim dividend at the rate of 5 per cent. per annum, free of tax, for the six months ended June 30.

**Brisbane Electric Tramways Investment Company.**—An interim dividend at the rate of 8 per cent. per annum (4s. per share) has been declared on the ordinary shares for the past half-year.

**Sale of Cheltenham and District Light Railway.**—This undertaking, which was opened by the late Mr. T. Nevins in 1901, has been disposed of to J. G. White and Company and Balfour, Beatty and Company for, it is stated, between £90,000 and £100,000.

**Cape Electric Tramways Company.**—The profits for the year ended June 30 were £80,978. To the reserve fund £8,000 has been added, and a dividend of 5 per cent., free of tax, is proposed on ordinary shares, leaving £2,517 to carry forward.

**Norwich Electric Tramways Company.**—For the year ended June 30, after providing for debenture interest, etc., and including £575 brought forward, the net profits were £10,561. The directors propose to transfer £2,500 to reserve (raising that fund to £15,170), and recommend a dividend of 3 per cent., leaving £141 to be carried forward.

**Ferranti, Limited.**—After payment of all charges and expenses of the recent issue of five-year notes, the net profit for the year ended June 30 was £28,142, comparing with £24,333 in the previous year. After payment of debenture and other interests, £10,000 is placed to depreciation and £22,000 to general reserve, carrying forward £452, against £1,245 brought in.

**British Interchangeable Rail Company.**—This private company has been registered with a capital of £15,000 in £1 shares, to acquire patents No. 646 of 1911 and 2466 of 1913, and adopt an agreement with H. Crudgington and H. T. Wakelam. The subscribers are:—H. Crudgington, King's Heath, metal merchant; F. W. Alabaster, Birmingham, merchant. The directors are F. N. Layman, E. Randle, E. Grantham, and H. Crudgington. The registered office is at 28, Victoria Street, London, S.W.

**London Combine Acquire Another Omnibus Undertaking.**—The agreement by which the Underground Electric Railways Company of London, Limited, will acquire outright the New Central Omnibus business provides that the New Central Company will receive £104,000 of 6 per cent. income bonds of 1933 and 48,500 A ordinary shares of 1s. each of the Underground Company, and a sum in cash which will enable the New Central Company, after providing for all prior charges, to pay a dividend at the rate of 8 per cent. per annum for the nine months ended June 30, 1913, from which date the interest and dividends on the new Underground bonds and shares will accrue. As the issued capital of the New Central Company is £96,089 in £1 shares, the purchase consideration provides a little more than £2 of Underground bonds and half a one-shilling A share for each New Central share. At the present prices of the Underground securities this is equivalent to a cash value of about £2 0s. 6d. for each New Central share.

**Hurst, Nelson and Company.**—Sir Thomas Mason, D.L., presided at the annual meeting, held in Glasgow on October 16. The chairman, in moving the adoption of the report and accounts, made reference to the loss sustained through the death of Mr. Andrew S. Nelson, manager and founder of the business. Mr. Nelson, he said, had been looking forward with great hopes to the result of the year's working. The profits were a matter for congratulation. The results obtained were more favourable than those of previous years, and altogether the balance-sheet showed a greatly improved position. They had been able to write off the whole balance of the expenses connected with the formation of the company. He moved that the arrears of the dividend on the preference shares be paid at the rate of 6 per cent., that a dividend of 6 per cent. on the preference share capital from May 15 to November 11 this year be paid, that £5,050 be reserved to pay on May 15 next a half-year's dividend, and that £10,000 be placed to a special reserve fund for security of dividends on the preference share capital. He also moved that a dividend on the ordinary shares of 5s. per share be paid, and that £2,257 be carried forward.

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**The British Electrical Federation.**—The traffic statement for the week ended October 17, 1913, shows that the receipts from tramways and railways amounted to £39,401, as compared with £37,133 in the corresponding week last year, and from omnibuses £13,092, as compared with £1,237, making a total of £52,493, as compared with £38,370. The tramway and railway route mileage was 429.82, as compared with 428.47. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working both last year and this year, the receipts show an increase of £2,783 upon the week.

**Sunderland District Tramways Company.**—An extraordinary meeting of the preference shareholders of the Sunderland District Electric Tramways, Limited, was held at Winchester House, London, recently, for the purpose of considering resolutions for the reduction of the capital of the company. Mr. H. R. Hogg (the chairman) proposed the following resolution:—"That this meeting of preference shareholders hereby approve the proposed reduction of the capital of the company from £170,485 to £51,407, by the cancellation of the sum of 10s. per share upon each of the 95,495 preference shares of £1 each, and the sum of 19s. per share upon each of the 74,990 ordinary shares of £1 each." The resolution was carried. The Chairman then proposed "That the right of the preference shareholders may be varied or modified in the following manner:—(a) That all arrears of dividend in respect of the preference shares be extinguished and cancelled; (b) that as and from the date of this resolution all preference shares be changed from cumulative shares to non-cumulative shares." Mr. G. C. Harvard moved that the following words be added to the resolution:—"Entitling the holders to a non-cumulative preferential dividend of 12 per cent. per annum." The resolution was carried in this amended form. At an extraordinary general meeting the resolutions as approved at the other meetings were adopted. On October 16 the foregoing resolutions were confirmed at meetings of the preference and ordinary shareholders.

## COPPER AND ALUMINIUM MARKET.

October 24, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, October 24. | Last week. | A Year Ago |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 74 5 0 .. | 73 0 0 .. | 75 10 0 |
| ,, ,, (three months) .. .. | 73 7 6 .. | 72 17 6 .. | 76 0 0 |
| Electrolytic Copper—bars or ingots .. | 78 0 0 .. | 77 0 0 .. | 80 0 0 |
| Aluminium—bars or ingots .. .. .. | 83 0 0 .. | 83 0 0 .. | 83 0 0 |

## COAL MARKET.

October 24, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, October 24. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 24 6 .. | 24 6 .. | 22 6 .. | 22 0 |
| Best Seconds .. .. .. | 23 9 .. | 23 6 .. | 22 0 .. | 21 6 |
| Ordinary Drys .. .. | 21 0 .. | 21 0 .. | 20 3 .. | 20 3 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 6 .. | 20 0 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 0 .. | 18 6 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 0 .. | 20 0 .. | 17 0 .. | 17 0 |
| Best Seconds .. .. | 19 3 .. | 19 0 .. | 16 6 .. | 10 6 |
| Ordinary Drys .. .. | 16 6 .. | 16 6 .. | 14 9 .. | 14 3 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 20 0 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 6 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 .. | 16 0 .. | 14 0 .. | 11 0 |
| Best Seconds .. .. | 13 0 .. | 13 6 .. | 13 0 .. | 10 3 |
| Smalls .. .. .. | 8 0 .. | 8 6 .. | 10 0 .. | 6 6 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Oct. 21 | £53,635 | £57,311 | 42 | £2,322,401 | +£182,157 |
| Auckland (28 days) | Sept. 26 | 18,498 | 19,943 | 13 | 61,553 | + 2,595 |
| Ballarat and Bendigo | Sept. 7 | 893 | 878 | 23 | 20,048 | — 318 |
| Brazilian St. Rly. Mlrs. | Sept. | 42,082 | 50,952 | 8 | 101,353 | + 18,853 |
| Brazilian Traction | Oct. 11 | 81,994 | 95,021 | 41 | 3,678,622 | + 51,588 |
| Brisbane | Sept. | 22,700 | 25,590 | 39 | 232,768 | + 51,674 |
| British Columbia $ | August | 675,272 | 770,628 | 8 | 1,526,571 | + 201,054 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacrosse | Sept. | 43,363 | 44,261 | 39 | 133,945 | + 6,907 |
| Calcutta Rs. | Oct. 18 | 71,784 | 53,404 | 42 | 27,13,102 | + 1,27,875 |
| Cape Town | Sept. | ... | 11,290 | ... | ... | ... |
| Carthagena & Herrerias | Sept. | 2,932 | 1,344 | 39 | 24,661 | + 5,395 |
| East India | Sept. | 1,931 | 2,028 | 8 | 4,033 | + 180 |
| Kalgoorlie | Sept. | 3,251 | 3,068 | 39 | 26,447 | — 2,341 |
| La Plata | Sept. | 4,183 | 4,528 | 39 | 45,611 | + 9,415 |
| Lima | Sept. | 22,660 | 34,110 | 39 | 300,647 | + 23,783 |
| Lisbon Mlrs. | June | 176,170 | 145,461 | 26 | 932,511 | + 96,433 |
| Madras (14 days) Rs. | Oct. 15 | 25,377 | 26,161 | 41 | 510,344 | + 35,831 |
| Melbourne | Sept. | ... | 62,000 | ... | ... | ... |
| Mexico $ | Sept. | 587,734 | 604,744 | 39 | 5,116,331 | + 107,899 |
| Montevideo | Sept. | 27,711 | 27,870 | 47 | 344,301 | + 26,484 |
| Para | Oct. 19 | 4,720 | 4,212 | 46 | 184,123 | + 42 |
| Perth (W.A.) | June 27 | 1,747 | 2,024 | 26 | 53,887 | + 5,582 |
| Port Elizabeth | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai $ | Oct. 15 | 22,199 | 26,400 | 41 | 911,252 | + 103,918 |
| Singapore $ | Oct. 18 | 10,456 | 18,071 | 42 | 502,896 | + 65,767 |
| Toronto $ | August | 727,925 | 850,222 | 34 | 6,317,674 | + 864,574 |
| Winnipeg $ | August | 309,764 | 840,607 | 34 | 2,649,702 | + 221,872 |

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended October 18 amounted to £232,675, or £16,276 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £81 6s. 7d. per track mile, an increase of £3 10s. 4d. per mile as compared with last year.

(*Continued from page 382.*)

## YORKSHIRE (WEST RIDING) ELECTRIC TRAMWAYS COMPANY, LTD.

TENDERS FOR STORES.

The Yorkshire (West Riding) Electric Tramways Company, Limited, invite tenders for the supply, during the year ending December 31, 1914, of the following Stores:—

Schedule No.

3. Bolts, Nuts, and Washers.
4. Brushes and Painters' Tools.
5. Cables and Wires.
6. Copper, Brass, and Gunmetal Castings and Fittings.
8. Cleaning Cloths, Cotton Waste, etc.
9. Drysalters' Sundries.
10. Electrical Lamps, Fittings, etc.
12. Engineers' Furnishings, etc.
13. Fibre, Leather, Rubber, etc.
17. Insulating Materials, Tapes, Compound, etc.
19. Iron and Steel.
20. Lubricants, etc.
23. Overhead Fittings.
24. Paints, Varnish, and Transfers.
25. Printing, Books, and Stationery.
29. Springs.
30. Steel Castings, etc. (Manufactured.)
31. Timber.
32. Uniform Clothing.

Schedules may be obtained from the Central Offices, Belle Isle, Wakefield, after November 9. A charge of 1s. (which is not returnable) is made for each schedule in duplicate, and a remittance covering the charge for schedules required must be sent with each application.

Samples may be inspected at the Company's Stores at Belle Isle, Wakefield, on November 19, 20, and 21 only, between the hours of 10 a.m. and 5 p.m.

Contractors are invited to call and examine the samples before tendering.

Sealed tenders must reach this address not later than 9 a.m. on Friday, December 5.

H. England,
General Manager.

Belle Isle, Wakefield, Yorks.,
October 25, 1913.

## POSITIONS VACANT.

### ASSISTANTS.

Required Assistants, with thorough experience of street passenger-carrying traffic; should be men with decided organising ability and initiative and competent to deal with traffic problems without supervision. Write, stating age, experience, and salary expected, to Box 4801, Willings, 125, Strand, W.C.

**DICK, KERR & CO.,**
**Limited,**
**ABCHURCH YARD, CANNON STREET,**
**LONDON, E.C.**
**ENGINEERS & CONTRACTORS.**

**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Oct. 15 | £1,365 | £1,505 | + £140 | 29 | £34,266 | + £2,291 |
| Accrington | ,, 15 | 561 | 576 | + 15 | 28 | 16,392 | + 1,543 |
| Ayr Corporation | ,, 18 | 210 | 256 | + 46 | 22 | 10,764 | + 1,435 |
| Bath Electric | ,, 15 | 824 | 869 | + 45 | 42 | 41,458 | + 3,200 |
| Birkenhead Corp. | ,, 19 | 1,163 | 1,292 | + 129 | 29 | 37,832 | + 3,775 |
| Birmingham Corp. | ,, 18 | 11,073 | 12,450 | + 1,377 | 29 | 336,686 | + 27,739 |
| Blackburn Corporation | ,, 15 | 1,324 | 1,259 | — 65 | 29 | 34,059 | + 3,581 |
| Blackpool & Fleetwood | ,, 18 | 401 | 626 | + 225 | 16 | 27,015 | + 4,461 |
| Blackpool Corporation | ,, 16 | 820 | 1,035 | + 215 | 28 | 70,051 | + 11,030 |
| Bolton Corporation | ,, 19 | 2,558 | 2,854 | + 296 | 29 | 80,262 | + 4,740 |
| Bournemouth Corp. | ,, 22 | 1,562 | 1,834 | + 272 | 29 | 67,069 | + 8,011 |
| Bradford Corporation... | ,, 18 | 6,001 | 6,170 | + 169 | 29 | 174,346 | + 10,376 |
| Brighton Corporation... | ,, 20 | 926 | 1,056 | + 130 | 29 | 35,181 | + 2,419 |
| Bristol | ,, 17 | 6,802 | 7,892 | + 1,090 | 41 | 337,547 | + 46,753 |
| British Elec. Federatn. | ,, 17 | 37,133 | 30,401 | * | ... | ... | ... |
| Burnley Corporation | ,, 18 | 1,552 | 1,737 | + 185 | 29 | 50,288 | + 6,082 |
| Burton-on-Trent Corp. | ,, 19 | 270 | 288 | + 18 | 29 | 8,587 | + 416 |
| Bury Corporation | ,, 19 | 1,268 | 1,386 | + 118 | 29 | 49,012 | + 1,563 |
| Cardiff Corporation | Sept. 20 | 2,514 | 2,712 | + 198 | 25 | 69,021 | + 7,732 |
| Chatham and District.. | Oct. 16 | 901 | 952 | + 51 | 41 | 38,633 | + 2,390 |
| Chesterfield Corp. | ,, 16 | 236 | 263 | + 27 | 28 | 7,460 | + 942 |
| Colne & Trawden | ,, 18 | 269 | 283 | + 14 | 42 | 11,611 | + 736 |
| Cork Electric | ,, 16 | 469 | 510 | + 41 | 41 | 20,875 | + 504 |
| Croydon Corporation ... | ,, 10 | 1,781 | 1,627 | — 154 | 26 | 46,778 | — 4,936 |
| Darlington Corporation | ,, 18 | 229 | 245 | + 16 | 29 | 7,292 | + 735 |
| Derby Corporation | ,, 18 | 894 | 971 | + 77 | 29 | 29,036 | + 3,117 |
| Dover Corporation | ,, 18 | 230 | 239 | + 9 | 29 | 7,844 | + 148 |
| Dublin & Lucan | ,, 17 | 131 | 123 | — 8 | 15½ | 2,562 | — 3 |
| Dublin United | ,, 17 | 5,682 | 4,158 | — 1,524 | 41 | 232,047 | — 11,703 |
| Dundee City | ,, 15 | 1,176 | 1,292 | + 116 | 22 | 29,440 | + 2,235 |
| East Ham Corporation | ,, 18 | 1,055 | 973 | — 82 | 29 | 29,519 | — 1,532 |
| Exeter Corporation | ,, 17 | 325 | 842 | + 17 | 29 | 10,452 | + 483 |
| Gearless Motor 'Buses. | ,, 18 | ... | 636 | ... | 28 | 13,951 | ... |
| Glasgow Corporation ... | ,, 18 | 19,514 | 21,311 | + 1,798 | 20 | 403,371 | + 28,901 |
| Glossop(U.Elec.Supply) | ,, 18 | 130 | 136 | + 6 | 42 | 5,491 | + 582 |
| Halifax Corporation ... | ,, 14 | 2,012 | 2,073 | + 61 | 28 | 61,677 | + 1,512 |
| Hastings & District..... | ,, 16 | 933 | 1,011 | + 78 | 42 | 45,193 | + 3,283 |
| Huddersfield Corp. | ,, 18 | 2,031 | 2,151 | + 120 | 29 | 62,648 | + 3,932 |
| Hull Corporation | ,, 18 | 3,711 | 4,420 | + 709 | 29 | 90,943 | + 5,044 |
| Ilford U.D.C. | ,, 18 | 389 | 439 | + 50 | 29 | 13,269 | — 1,371 |
| Ilkeston Corporation ... | ,, 22 | 159 | 179 | + 20 | 30 | 4,058 | + 672 |
| Ipswich Corporation ... | ,, 18 | 400 | 428 | + 28 | 29 | 14,272 | + 555 |
| Isle of Thanet | ,, 18 | 413 | 494 | + 81 | 3 | 1,365 | + 110 |
| Kilmarnock Corp. | ,, 18 | 163 | 169 | + 6 | 22 | 4,045 | + 280 |
| Lanarkshire | ,, 16 | 1,589 | 1,855 | + 266 | 41 | 69,366 | + 8,579 |
| Lancashire United | ,, 15 | 1,440 | 1,647 | + 207 | 41 | 64,043 | + 7,417 |
| Leeds City | ,, 18 | 7,927 | 8,313 | + 386 | 29 | 242,408 | + 16,004 |
| Leicester Corporation... | ,, 18 | 2,671 | 2,882 | + 211 | 42 | 117,700 | + 11,096 |
| Leith Corporation | ,, 18 | 625 | 687 | + 62 | 22 | 16,516 | + 674 |
| Leyton U.D.C. | ,, 9 | 1,279 | 1,343 | + 64 | 27½ | 37,894 | — 698 |
| Liverpool Corporation.. | ,, 18 | 12,221 | 13,435 | + 1,214 | 42 | 539,533 | + 41,189 |
| Llandudno &Colwyn B. | ,, 17 | 203 | 213 | + 10 | 46 | 16,676 | + 1,419 |
| London County Council | ,, 15 | 40,862 | 42,858 | + 1,996 | 23 | 1,192,128 | — 8,138 |
| London Gnl. Omnibus.. | ,, 18 | 59,644 | 66,349 | + 6,705 | 42 | 2,616,248 | + 488,347 |
| London United | ,, 17 | 5,823 | 6,156 | + 333 | 42 | 266,472 | + 4,085 |
| Lowestoft Corporation | ,, 18 | 190 | 204 | + 14 | 2 | 532 | + 13 |
| Maidstone Corporation | ,, 16 | 198 | 203 | + 5 | 39 | 6,191 | + 359 |
| Manchester Corp. | ,, 18 | 17,103 | 18,032 | + 929 | 29 | 512,668 | + 25,949 |
| Met. Elec. Trys. | ,, 17 | 8,377 | 9,022 | + 645 | 42 | 380,060 | + 12,311 |
| Nelson Corporation | ,, 18 | 203 | 206 | + 3 | 20 | 6,254 | + 378 |
| N'castle-on-Tyne Corp. | ,, 18 | 4,535 | 5,005 | + 470 | 29 | 140,469 | + 12,946 |
| Newport (Mon.) Corp. | ,, 18 | 701 | 783 | + 82 | 29 | 22,413 | + 1,799 |
| New St. Helens & Dist... | ,, 15 | 754 | 797 | + 43 | 16 | 14,036 | + 1,594 |
| NorthamptonCorp | ,, 17 | 532 | 547 | + 15 | 29 | 17,162 | + 1,165 |
| Nottingham Corp. | ,, 16 | 3,217 | 3,411 | + 194 | 28½ | 96,886 | + 4,401 |
| Oldham Corporation ... | ,, 19 | 2,100 | 2,370 | + 270 | 30 | 66,709 | + 4,361 |
| Portsmouth Corp. | ,, 18 | 1,936 | 2,199 | + 263 | 29 | 70,862 | + 4,180 |
| Preston Corporation ... | ,, 15 | 783 | 873 | + 85 | 29 | 25,944 | + 1,569 |
| Provincial | ,, 18 | 1,728 | 1,908 | + 180 | 3 | 4,907 | + 371 |
| Reading Corporation ... | ,, 16 | 611 | 685 | + 74 | 28 | 20,177 | + 1,371 |
| Rochdale Corporation | ,, 18 | 1,597 | 1,670 | + 73 | 29 | 47,485 | + 1,739 |
| Rotherham Corp. | ,, 22 | 898 | 1,067 | + 169 | 29 | 29,356 | + 7,263 |
| Salford Corporation ... | ,, 20 | 4,911 | 5,329 | + 418 | 29 | 153,316 | + 6,157 |
| Sheffield Corporation... | ,, 19 | 6,973 | 7,539 | + 566 | 31 | 218,006 | + 19,041 |
| Southampton Corp. | ,, 15 | 1,145 | 1,303 | + 158 | 28 | 39,231 | + 2,262 |
| Southend-on-Sea Corp. | ,, 15 | 626 | 841 | + 215 | 29 | 30,903 | + 5,176 |
| South Met. Trys. | ,, 17 | 834 | 1,047 | + 213 | 42 | 38,512 | + 2,757 |
| South Shields Corp. | ,, 18 | 634 | 699 | + 65 | 29 | 21,431 | + 2,770 |
| Sunderland Corp. | ,, 19 | 1,241 | 1,423 | + 182 | 29 | 43,091 | + 4,734 |
| Sunderland District ... | ,, 15 | 496 | 545 | + 49 | 50 | 28,186 | + 4,876 |
| Swindon Corporation ... | ,, 15 | 158 | 166 | + 8 | 27 | 4,854 | + 354 |
| Trys. (M.E.T.) 'Buses | ,, 18 | ... | 8,289 | ... | 33 | 189,204 | ... |
| TynesideTrys.&Tmrds | ,, 15 | 476 | 492 | + 16 | 16 | 8,441 | + 553 |
| Wallasey Corporation | ,, 18 | 1,022 | 1,199 | + 177 | 29 | 36,033 | + 3,493 |
| Walsall Corporation ... | ,, 18 | 595 | 651 | + 56 | 42 | 26,112 | + 1,853 |
| Walthamstow U.D.C.... | ,, 18 | 628 | 711 | + 83 | 29 | 22,183 | + 308 |
| Warrington Corp. | ,, 16 | 433 | 458 | + 25 | 29 | 12,777 | + 440 |
| West Ham Corporation | ,, 16 | 2,439 | 2,691 | + 252 | 28 | 73,357 | + 2,670 |
| Wigan Corporation | ,, 16 | 1,448 | 1,576 | + 128 | 23½ | 42,452 | + 4,374 |
| Wolverhampton Corp | ,, 22 | 1,021 | 1,057 | + 36 | 30 | 32,393 | + 1,876 |
| Yorkshire (W. Riding) | ,, 19 | 1,294 | 1,481 | + 187 | 42 | 61,025 | + 6,577 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,753 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Oct, 18 | £5,395 | £5,001 | — £394 | 42 | £201,775 | + £7,240 |
| City and South London | ,, 18 | 2,918 | 2,655 | — 263 | 42 | 116,607 | — 11,121 |
| Liverpool Overhead | ,, 19 | 1,595 | 1,705 | + 110 | 42 | 72,198 | + 5,510 |
| London Electric | ,, 18 | 13,950 | 13,485 | — 465 | 42 | 567,450 | + 1,440 |
| Mersey | ,, 18 | 2,300 | 2,292 | — 8 | 42 | 98,920 | + 5,009 |
| Metropolitan | ,, 19 | 16,952 | 18,161 | + 1,209 | 42 | 719,176 | + 20,767 |
| Metropolitan District... | ,, 18 | 13,241 | 13,266 | + 25 | 42 | 542,052 | + 17,637 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations. October 24. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 70 — 75 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | — 1/4 | 4 5/8 — 4 7/8 |
| 5 | Do. 5½% Cum. 2nd Pref. | — 1/8 | 4 1/4 — 4 3/8 |
| 100 | Do. 4% Deb. Stk. Red. | ... | 91 — 93 |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 98½ — 98½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 98½ — 100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 — 102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | 3/4 — 1 |
| 1 | Do. 5% Cum. Pref | ... | 25/32 — 3/4 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref. | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | + 1 | 88 — 90 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | — 3/8 | 99 — 102 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 7 — 7½ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 — 102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — ½ | 120 — 124 |
| 100 | Do. Pref. Ord. Stock | ... | 109 — 113 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | ... | 99 — 102 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 97 — 100 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 — 104 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. | ... | 89 — 92 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | — 2½ | 86 — 89 |
| 100 | Do. 7% Non-Cum. Pref. | ... | 48 — 51 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 12½ — 14½ |
| 100 | Do. Deferred Ord. Stock | ... | 4 — 6 |
| 100 | Do. 5% Perpetual Debenture Stock | ... | 91 — 94 |
| 100 | Do. 4½% Second Debenture Stock, Red | + 1 | 77 — 80 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. | ... | 6 — 6¼ xd |
| 5 | Do do. 5% Cum. Pref. | ... | 5 — 5¼ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., | ... | 11/16 — 13/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs. Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5⅛ — 5⅜ |
| 100 | Do. 4% Debenture Stock Red, 1935 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 90½ — 94½ |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 93½ — 95½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅝ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | ... | — 10¾ |
| 10 | Do. do. 6% Pref. | + 1/8 | — 11⅝ |
| 100 | Do. do. "A" Red. | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 79 |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 8¾ — 9¼ |
| 10/- | Hastings & Dist. Electric Trams. Co. Ld., Ord. | ... | 3/32 — 3/16 |
| 1 | Do. do. 6% Cum. Pref. | ... | 1/8 — 3/16 |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. | ... | 6½ — 6¾ |
| 100 | Do do. 4½% Deb. Stock | ... | 77½ — 78½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2 1/16 — 2 1/8 |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 3/32 — 5/32 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. | — 8 | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 3/4 — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1 — 1⅛ |
| 1 | Do. 6% Cum. Pref. | ... | 1 1/16 — 1 1/8 |
| 100 | Do. 5% Mort. Debs. | .. | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | 1/4 — 3/8 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 95 — 97 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 87 — 89 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | — 1 | 59 — 63 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 87 — 89 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 108 —111 |
| $1,000 | Do. do. 5% Bds. | ... | 97 — 99 |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 32/32 — 1 1/32 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red. | ... | 82 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| $100 | Mexico Tramways Co., Common Stock | — 4 | 79 — 82 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 5 | 79 — 82 |
| 100 | Do. 6% 50-yr. Mort. Bonds | — 4½ | 85 — 89 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | ... | 93 — 95 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 97 — 99 |
| 100 | Do. 4½% Sterling Debs, (1922) | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd | ... | 1 1/16 — 1 1/8 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 6 1/2 — 6 3/4 |
| 10 | Do. do. 5% Cum Pref. | ... | 5 5/8 — 6 1/8 |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | — 3/16 | 5¾ — 6⅛ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4½ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. | ... | 1 1/16 — 1 3/16 |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 7/16 — 7/16 |
| 1 | Do. 5% Cum. Pref. | ... | 1/2 — 1/2 |
| 130 | Do. 4½% Debenture Stock, Red. | ... | 82 — 85 |
| 1 | Provincial Tramways, Lim., Ord. | ... | 3/4 — 31/32 |
| 10 | Do. 5% 1st Deb. Stock | ... | 97½ —100½ |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | — 1 | 83 — 86 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. | ... | 5 — 5½ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | — 1 | 94 — 96 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 83 — 85 |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds | ... | 98½ —101½ |
| 100 | 5% 50-yr. Mort. Gold Bonds | ... | 88½ — 90½ |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 100 —103 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | ... | 98 —101 |
| 10 | Shanghai Elec. Construction Co. | ... | 10¼ — 11½ |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 88 — 90 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 5/8 — 3/4 |
| 100 | Do. do. 4% Deb. Stk. | ... | 68 — 73 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | — 1 | 86 — 88 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | + 4 | 91 — 95 xd |
| 5 | United Elec. Tramways of Monte Video, Ord. | + 1/16 | 5 — 5⅜ |
| 5 | Do. do. 6% Cum. Pref. | + 1/16 | 5 — 5⅜ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 97 —100 |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 98½ —100½ |
| 5 | Yorkshire(West Riding) Elec. Trys. Co., Ord. | ... | 1/4 — 1/2 |
| 5 | Do. do. 6% Cum. Pref. | ... | 3 3/8 — 3 7/8 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 81 — 85 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 22. ] LONDON, SATURDAY, NOVEMBER 1, 1913. [ Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

**Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.**

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### COUNTY BOROUGH OF BOURNEMOUTH.

TRAMWAYS DEPARTMENT.

TENDERS FOR UNIFORM CLOTHING AND CAPS.

The Tramways Committee are prepared to receive tenders for the supply of :—

(a) Uniform Clothing,
(b) Uniform Caps,

for their Inspectors, Motormen, and Conductors.

Forms of tender may be had on application to the undersigned at the Tramways Offices, Lansdowne Crescent, Bournemouth.

Sealed tenders, which must be made on the official form and enclosed in the printed envelope provided, to be delivered to the Town Clerk, Municipal Buildings, Bournemouth, not later than 12 o'clock noon on Thursday, November 20, 1913.

The Committee do not bind themselves to accept the lowest or any tender.

The contractor will be required to pay not less than the standard rate of wages current in the district where the goods are made.

I. BULFIN,
General Manager.

Tramways Offices, Bournemouth,
October 29, 1913.

### THE DUBLIN UNITED TRAMWAYS COMPANY (1896), LTD.

The Company is prepared to receive tenders for the supply of General Stores, including Car Fittings, Iron, Steel, Castings, Oils, Paints, Glass, Brushes, Ironmongery, Harness, Materials, Electric Supplies, Timber, etc., for the year ending December 31, 1914.

Forms of tender (price 2s. each), conditions, and all information can be obtained and patterns seen at the Secretary's Office, 9, Upper Sackville Street, from the 3rd to the 15th November, 1913.

Prices and quality being equal, preference will be given to goods of Irish manufacture.

Tenders, sealed and marked on the outside "Tenders for Stores," and addressed to the Chairman, Dublin United Tramways Company, must be lodged with me on or before November 17, 1913.

(By order) R. S. TRESILIAN,
Secretary.

9, Upper Sackville Street, Dublin,
October 27, 1913.

### SURBITON URBAN DISTRICT COUNCIL.

MOTOR FIRE ENGINE AND MOTOR TENDER.

The above-named Council are prepared to receive tenders for the supply of a Motor Fire Engine and Motor Tender. Further particulars and conditions of tender may be obtained from the undersigned.

FREDERICK W. WOOD,
Clerk to the Council.

District Council Offices, Surbiton,
October 21, 1913.

### WALSALL CORPORATION TRAMWAYS.

STORES.

The Corporation of Walsall invite tenders for the supply to the Tramways Department for the year 1914 of the under-mentioned Stores :—

| | |
|---|---|
| Motor Grease. | Gears and Pinions. |
| Lubricating Oil. | Insulating Material. |
| Brushes. | Trolley Wheels. |
| Cleaning Material. | Etc., etc. |

Forms of tender and further information may be obtained at the Tramway Manager's Office, Birchills Depôt, Walsall.

Tenders, sealed and endorsed "Tender for Stores," are to be sent to H. Lee, Esq., Town Clerk, Council House, Walsall, on or before November 22.

Samples (which will not be paid for by the Corporation) are to be sent to the Birchills Depôt, Bloxwich Road, Walsall.

The Corporation do not bind themselves to accept the lowest or any tender, and they will not accept the tender of any firm or person paying to their workmen less than the standard rate of wages.

R. L. HORSFIELD,
General Manager.

Birchills Depôt, Walsall,
October 29, 1913.

### WALTHAMSTOW URBAN DISTRICT COUNCIL.

ADVERTISING ON ELECTRIC TRAMCARS.

The Council invite tenders for the sole right of Advertising upon their Thirty eight Electric Tramcars for alternative periods of three or five years, commencing on the 15th January, 1914.

Specification and form of tender may be obtained on application to the Tramways Manager, Car Depôt, Chingford Road, Walthamstow, and any information required obtained from him as to the car service and form of contract, etc.

Sealed tenders, endorsed "Advertisements on Tramcars," addressed to the undersigned, must be delivered by post only not later than 12 o'clock noon on Wednesday, the 12th day of November, 1913, at the Clerk's Office, Town Hall, Walthamstow.

The Council do not bind themselves to accept the highest or any tender.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
October 21, 1913.

## POSITIONS VACANT.

### WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The above Council require the services of an Assistant in the Electrical Engineer's Department at a commencing salary of £150 per annum.

Candidates must have had experience on an undertaking combining three-phase and direct current systems of supply, and preference will be given to those conversant with mains' work.

Applications, in candidates' own handwriting, stating age, full particulars of training and experience, and accompanied by copies of three recent testimonials, endorsed "Assistant in Electricity Department," to be sent by post only to the undersigned, not later than 5 p.m. on Wednesday, the 12th day of November, 1913.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
October 28, 1913.

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## COUNTY OF LONDON.

CHARGE SHIFT ENGINEER AT THE GREENWICH GENERATING STATION.

The London County Council invites applications for the position of Charge Shift Engineer at the Greenwich Electricity Generating Station in the Tramways Department at a salary of £250 a year, rising by annual increments of £10 to £300 a year.

Members of the Council's staff are not precluded from making application for the appointment. Candidates must be not less than 28 and not more than 40 years of age, and have had experience in the running and maintenance of high-tension electrical plant, steam turbines, and water-tube boilers.

Applications must be made on the official forms, which may be obtained, together with a statement of the conditions upon which the appointment will be held, from the Clerk of the Council, County Hall, Spring Gardens, S.W., to whom the application forms must be returned not later than 11 a.m. on Wednesday, November 12, 1913.

All communications on the subject must be marked on the envelope "Charge Shift Engineer," and a stamped addressed foolscap envelope must be enclosed. The canvassing of members of the Council will be held to be a disqualification for the appointment.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens,
October 23, 1913.

## COUNTY BOROUGH OF WEST HAM.

TRAFFIC SUPERINTENDENT.

The Council invite applications from qualified persons for the position of Traffic Superintendent of their Tramways, at a commencing salary of £225 per annum.

The person appointed will be responsible to the Tramways Manager for the proper and efficient working of the Traffic Department, including the ticket and cash branches.

Applications, in candidate's own handwriting, stating age, experience, and present position, together with copies of three recent testimonials, must be addressed to Mr. J. S. D. Moffet, Tramways Manager, Tramway Offices, Greengate Street, Plaistow, E., not later than 10 a.m. on Wednesday, November 12, 1913.

H. W. GREAVES,
Town Clerk.

Town Hall, West Ham,
October 29, 1913.

## ASSISTANTS.

Required Assistants, with thorough experience of street passenger-carrying traffic; should be men with decided organising ability and initiative and competent to deal with traffic problems without supervision. Write, stating age, experience, and salary expected, to Box 4801, Willings, 125, Strand, W.C.


**SIMPLEX CONDUITS, Ltd.**
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
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PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON."
Telephone: 368. LONDON WALL.

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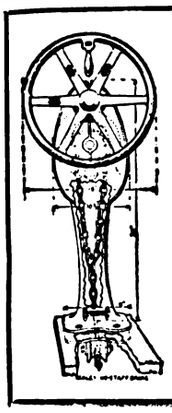
**PINCHIN JOHNSON & CO., Ltd.,**
MINERVA HOUSE,
BEVIS MARKS, LONDON, E.C.



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Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
Cie. Francaise des Freins Ackley, 62, Rue St. Lazare, Paris.
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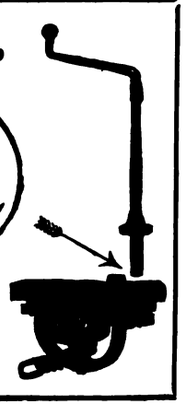


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THE
# Tramway and Railway World

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*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, NOVEMBER 1, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
[HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## RETURN TICKETS AND IMPROVING RECEIPTS.

Motor omnibus competition with tramways has evidently entered on a new and interesting phase. The subject was discussed at considerable length at the recent Municipal Tramways Conference, and it was agreed that the tramways in London were very hardly hit by a form of competition which contributes nothing to the maintenance of the streets. For a long time the traffic receipts of the London County Council tramways showed steady decreases as compared with the corresponding periods of the previous year, and it will be remembered that for the financial year 1912-13 the accounts revealed that after making allowance for interest and sinking fund there was practically nothing left to go to the reserve. The omnibus competition was a factor, however, in stimulating the Highways Committee of the London County Council to make further efforts to popularise their tramway system, and it seems a pity that these efforts were not begun at an earlier date before the omnibus competition became so acute. For many years cheap return fares had been in force on certain routes of the tramway north of the Thames, but it was not until July, 1912, that the Council began to experiment with such fares on the routes south of the river. The system was then gradually developed until now return tickets are issued not only on all the through routes for the entire distances, but they are also obtainable for certain intermediate stages. They mean a saving of at least 1d. for the double journey as compared with two single fares. Last week the Highways Committee reported that in consequence of the return fares there has been a rapid increase in the number of return tickets sold; that this increase still continues, and that a very large number of high priced tickets are being issued, indicating that the public are prepared to ride long distances by tramcar. There has been a marked increase in the total number of passengers carried since February last, when return tickets between intermediate points came into operation. This week the Highways Committee go a step further, because they announce that they have arranged for return fares for no fewer than thirty-one different journeys in South London which require change of cars. The new feature now becoming increasingly evident is that the traffic receipts from the Council's tramways have turned the corner. The long series of decreases as compared with the previous year have come to an end, and since the early summer the receipts week by week have shown increases which are now amounting to about £2,000 a week, or an increase of 5 per cent. This increase is not, of course, due solely to the development of the return ticket system, but undoubtedly that has been a material factor. Another cause is undoubtedly to be found in the fact that motor omnibus competition has now practically reached high water mark. There are few tramway routes of any importance along which omnibuses do not now run, and with great frequency. The omnibus competition can, indeed, hardly be increased. Whenever in any large town local travelling facilities are increased, improved and cheapened, the number of passengers and the traffic receipts increase in a still greater ratio. This is a fact that is even more striking in London, with its vast population, than in any other town in the country. To promote still further the recovery in receipts, the point on which all the tramway managers in the metropolitan area should concentrate, after granting return fares, is regularity of service. In London, owing to the congestion of traffic, this is not an easy matter, but the greater the regularity of the service, the more will the public flock to the tramways.

## INTERNATIONAL TRAMWAY CONGRESS AT BUDAPEST.

The Executive Committee of the "Union International de Tramways et de Chemins de fer D'Interet Local" have accepted the invitation of the Hungarian Government and the City of Budapest to hold the eighteenth biennial International Tramway Congress at Budapest. The date has been fixed for August 31, 1914, and further particulars will be published later. The list of questions selected by the Executive Committee for discussion is as follows:—

1. The policy of the distribution of population in towns with regards to means of transport.

A. The influence of new methods of transport upon the development and extension of great cities. The influence of modern transportation methods upon social customs.

B. Tariffs of tramways and city and suburban railways:—

1. Bases and methods of investigation. Influence upon traffic.

2. Transfer tickets at reduced prices. Influence upon results of working.

3. Season tickets and various methods of calculating their prices.

Reporters: MM. Duval-Arnould, Membre du Conseil Municipal de la Ville de Paris, and Dr. Kuhles, Membre du Conseil Municipal de la Ville de Munich.

2. Corrugation of rails.

Reporters: MM. Busse, Ingénieur en chef de la Grande Compagnie des Tramways de Berlin, and Resal, Directeur de la Compagnie Française des Tramways électriques et Omnibus de Bordeaux.

3. Rails and tires.

A. Investigation into the best shape for rails and tires, in order to obtain the lowest rolling co efficient and a minimum wear of tires on curves. Sections of rails with and without grooves; sections of tires; position of tires on the rails on straight and on curves; influence of wheel-base on curves.

B. Use of special rails for curves (managanese rails; rails with moveable lip adjustable or otherwise).

Reporters: MM. Bacqueyrisse, Ingénieur en chef des Tramways de la Compagnie Générale des Omnibus de Paris, and Minorini, Ingénieur, Directeur des Tramways municipaux de Milan.

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4. Roller or ball bearings. Results obtained on motor cars, and on trailers. Resulting saving of current secured.

Reporters: MM. Largiader, Directeur des Tramways municipaux de Zurich; Schoerling, Ingénieur en chef des Tramways de Hanovre; and Tobias, Conseiller technique, Directeur des Ateliers des Tramways électriques de Budapest.

5. Motormen, conductors, and inspectors.

A. Methods of instructing them.

B. Ticket checking. Methods of delivery of tickets to conductors, accounting for tickets sold, and collection of money.

Reporters: MM. Noirfalise, Directeur Général de la Société Anonyme des Tramways Liégeois, Liége, and Karl Roethy, Inspecteur en chef des Tramways de Budapest.

6. Special appliances for wagons of narrow gauge lines to facilitate the exchange of goods with standard railways. Results obtained from the point of view of time taken and the cost of transshipment.

Reporter: M. Sapin, Administrateur-Directeur de la Compagnie Centrale de Chemins de fer et Tramways électriques, à Paris, Administrateur des Tramways d'Ekaterinoslaw, Bruxelles.

7. Method of working on a length of line common to different concessions. Division of receipts and expenses.

Reporter: M. Fr. Carnevali, Ingénieur en chef de la Société des Tramways de Turin.

8. Light railway locomotives.

A. Improvements made during recent years.

B. Is it of advantage:—

1. To conceal the wheels and the motor mechanism by a metallic cover?

2. To have a platform at each end of the locomotive?

Reporter: M. Hamelink, ancien Directeur de la Compagnie des Tramways Néerlandais, Utrecht.

C. Employment of superheaters.

Reporter: M. de Soignie, Directeur de la Société Anonyme Mosane pour l'exploitation des Chemins de fer Vicinaux, Andenne (province de Namur).

9. Subterranean feeder cables.

A. Technical conditions which must be met by armoured cables.

B. Use of aluminium as a conductor.

C. Probable life of subterranean cables. Statistics.

Reporter: M. Sekutowicz, Directeur des Exploitations de l'Omnium Lyonnais de Chemins de fer et de Tramways, Paris.

10. Three wire distribution for a tramway system. Distribution by higher tension in the suburbs than in the city. Special arrangements of rolling stock, of the generating machinery, and distribution system in order to meet these problems.

Reporter: M. Sieber, Directeur des Tramways de Nuremberg-Furth, Nuremberg.

11. Advantages and disadvantages of various systems of transforming high tension or alternating current to continuous current; motor-generators, transformers, and rotary transformers, etc.

Reporters: MM. Dalyrymple, General Manager, Glasgow Corporation Tramways, and Sarrat, Ingénieur en chef à la maison E. L. J. Empain, Bruxelles.

12. A. Facilities given to the public for entering carriages; signs at stopping points; distribution of numbers; covered shelters; moveable barriers and corridors and refuges; raised platforms; the advantage at times of heavy traffic of supplementary cars, either motor or trail cars.

B. Means of communicating to the public the destination and route of cars, both inside and outside the cars.

C. Commercial publicity employed for the purpose of increasing the receipts of tramways and light railways.

Reporter: M. Rodolphe de Weck, Ingénieur des Arts et Manufactures, Directeur de la Société des Tramways de Fribourg et du Chemin de fer Fribourg-Morat-Anet, Président de l'Union de Chemins de fer secondaires suisses, Fribourg (Suisse).

## SUGGESTIONS FOR MANCHESTER.

REPLY OF THE TRAMWAYS MANAGER ENDORSED BY THE CHAIRMAN.

As the result of "slack season" correspondence in the Manchester newspapers a meeting was recently held for the discussion of how to bring about "a better Manchester." A committee has since placed suggestions before candidates for the municipal elections. A list of the tramway questions were supplied to Mr. J. M. McElroy, the general manager, on behalf of the "Better Manchester" Committee of Citizens, and on October 26 Mr. McElroy made a statement in reference thereto, and his remarks were confirmed by Alderman Bowes, the chairman of the Tramways Committee.

Nearly all of the questions, Mr. McElroy said, had been before the committee for a considerable time. All this year they had been experimenting with numbers for each route, and they saw nothing to beat the design made in their own workshops. It would be illuminated at night. As to extending the hourly night service to 12.30 on Saturday, the existing service would be continued until Christmas, when the analysis of the passenger returns would be considered. As part of the route numbering scheme small hand maps of the system would be available free to the public. The request for a framed map of the entire system in the cars was covered by the issue of hand maps. With regard to indicating at termini and centres of towns the starting and finishing times of each route, the committee thought of indicating this upon the hand maps. Transfer tickets were open to so much abuse that those authorities which had adopted them now wished they had not done so. In Paris the tickets had been discontinued recently.

Dealing with first-class cars for through cars with no fares less than twopence, Mr. McElroy said "the committee are opposed to first-class cars; in fact the requisition for them had only 50 signatures. As to twopenny fares, you must know that the short penny rider is the backbone of our system. Persons who get long distances for twopence dislike the short penny rider, but he is the very man who puts us in a position to give the long ride for twopence. We cannot cut him out." A window in the sliding door on top of non-bogie cars to save opening the door to collect fares was a very small matter, and they had not given much consideration to it. A dozen times the committee had agreed not to allow district nurses to travel free. If free rides were once given where was the line to be drawn? Salford Tramways Committee had not seen their way to fall in with the suggestion for through cars to Salford, and the idea of an inner circle of cars connecting the railway stations had been tried, and it proved a failure.

Experiments had been made over a series of years with means of protecting motormen, but there are wide divisions of opinion, both from the point of view of management and among the drivers themselves as to their desirability. After all, the important thing was not to do anything which would jeopardise the public safety. The Board of Trade had considered the matter, and were not prepared to make any recommendations or regulations, because they had not made up their minds. Some, including drivers themselves, thought that glass vestibules such as had been tried impaired their vision and hearing. In the matters of providing shelters, with sitting accommodation and lavatories, where possible, and of roofing all island platforms, a joint committee of the Tramways and Sanitary Committees had been at work for two years, and in addition the Tramways Committee had themselves been putting up shelters.

The placing of the sign "Full" on each end of the car had been tried in a number of places and found useless. The guard could not be on the platform all the time, and passengers could get on and off the car while the guard was not in a position to operate the sign. The general manager of the tramways in Glasgow said: "We found the board of practically no utility, and we have ceased to make any use of it." (We may add that in London the sign is found to be useful in preventing rushes being made for a full car and in saving people the trouble of hailing a car at intermediate points.) While admitting that the rotation ticket system was utilised in Paris, Mr. McElroy said it would be impracticable here. Fancy people in a crowded place having to shout "one," "two," or "three," and being admitted to the car in that order. The committee could not adopt the contract ticket system as it led to abuse.

As to the abolition of standing inside cars, the Tramways Committee were considering the whole question of how to meet the requirements of the travelling public. In the first six months of this year 10,000,000 more passengers were carried than in the corresponding period of last year. The problem was therefore becoming very serious. He was preparing a report for the committee on his observations in America, on the Continent of Europe, and elsewhere. The report, which would be issued two or three months hence, would deal with the whole question of passenger transportation in Manchester and the surrounding district. For the present the committee had to admit that it was impossible to give everybody a seat at the times of rush.

## MR. J. DALRYMPLE ON HIS AMERICAN TOUR.

The general manager of the Glasgow Corporation tramways returned to Glasgow on October 27 in company with Mr. T. Nisbet, the master of works to the City Council, after a tour in the United States and Canada. It was on August 9 that the two travellers sailed for New York, Mr. Dalrymple's object being to visit the most important cities where tramways are in operation in order to inspect the latest methods of working and regulation. Mr. Nisbet was charged with the duty of inspecting places where different types of opening bridges may be seen, as the Glasgow Corporation propose to construct a new bridge over the Clyde, the structure to be available for tramcar traffic.

Mr. Dalrymple's previous visit to the North American continent in 1904 to advise the Chicago City Council on the matter of tramway municipalisation had evidently not been forgotten, for in an interview given after his return to Great Britain the Glasgow manager said:—"We were well received everywhere we went. The fame of Glasgow as a municipality has spread far and wide, and the people over there look to Glasgow as the city to be followed and watched in many respects. They were very anxious to get at the facts first hand. In two different places we visited we were simply peppered with questions for an hour and a half by the leading citizens. Americans do not seem to count the cost of anything so long as it is going to be an advantage to the community. In New York, for instance, they were making contracts that would involve the expenditure of sixteen million pounds for additional transit facilities, while in Philadelphia similar proposals were being made to the extent of seven millions.

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"Just now the tramway systems are in a state of transition over there, because they do not exactly know what is before them in the way of municipalisation. In Canada there are several towns that operate their tramways municipally; but in the States the only one, I believe, is San Francisco, where they are working a single road from one end of the city to the other. But things are moving very fast, and in a short time I expect there will be something done in the way of a change in regard to municipal ownership.

"As respects fares, they are in a great difficulty. The tramway people are quite satisfied our graded system is best. All over America, except in one or two towns, there is a uniform charge of five cents, and this sum has to be paid by passengers travelling over the shortest journey. Another difficulty is that the cities are extending their boundaries to a large extent, and passengers are getting the advantage of travelling over the extended distance without paying anything extra. There is no doubt that the companies have to carry a large number of people at a loss."

Mr. Dalrymple was much struck by the overcrowding of the cars. "At certain times of the day," he said, "when people are going to and returning from their work it is positively scandalous. They cannot understand how we in Glasgow can carry as many people as they do and have no overcrowding." Asked to account for this he replied:—"For one thing nearly all the cars in America are single-deckers, but the chief explanation is that here, with our low fares, we require to maintain a good and a close service during the whole of the day, whereas over there practically all the traffic is done in the morning and at night. The cars are not nearly so well filled between these periods as in Glasgow."

Particular attention was paid by Mr. Dalrymple to the great changes in car construction which are being made, and he mentioned that in New York experiments were being made with a centre entrance car with a very low step. This car was illustrated and described in THE TRAMWAY AND RAILWAY WORLD of May 9, 1912. "The step," he said, "almost touches the ground, which is very convenient for ladies and elderly persons. They are also experimenting with a double-deck car like our own [*vide* THE TRAMWAY AND RAILWAY WORLD, September, 1912], and they seem very highly pleased with it. There are cars of a similar type in Pittsburg, and I understand they are going to try them in Washington.

"In other cities they are experimenting with cars which the passengers enter and leave at the driver's end instead of at the rear. The driver and conductor are both at the front. The advantage is supposed to be that the people getting out by the front run less risk of meeting with an accident. They cannot, for instance, run in front of a car coming from the opposite direction."

What Mr. Dalrymple witnessed in regard to the protection of tramcar passengers at stopping places shows that American towns are far in advance of this country. As far as the danger arises from automobile traffic the public here are given special protection by the first clause of the Motor Car Act, 1904, which deals with driving to the danger of the public. In London the police appear to do nothing to enforce the clause, and the public are ignorant of its existence. It is satisfactory to note, however, that recently the Tramways Department of the London County Council have obtained convictions of motor omnibus drivers under this clause. Mr. Dalrymple's observations upon American practice were made public at an opportune moment, for yesterday (Friday) the Glasgow Corporation had submitted to them the by-laws framed by the magistrates for the regulation of vehicular traffic at tramcar stopping places. These by-laws, as announced in our issue dated October 16, have been agreed to by the Scottish Automobile Club.

"It is very general in America," said Mr. Dalrymple, "that no vehicle whatever is allowed to pass between the car and the kerb at a stopping place. This rule is rigidly enforced at every place I was in. In most cities it is a law, and is strictly observed by automobile drivers and others without question. When the car comes to a stopping place any vehicles that may be behind stop too, and wait till the car goes on. In several cities they go to the length of placing a pole between the kerb and the car lines at a stopping place, so that passengers waiting on a car do not require to stand on the pavement, but can stand with safety on the street. All over America it is recognised that car passengers are part of the traffic of the street, and have to be protected. Drivers of automobiles and other vehicles seem to have fallen into the idea quite easily, and there is no question about it. The pole, I should explain, is not a fixture, but is portable, with an iron base, so that if anything did run up against it it would merely topple over."

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**Postponement of a Step Towards Linking South Shields with Sunderland.**—South Shields Tramways Committee recommended the Council at their October meeting to obtain a light railway Order for an extension of the tramways to Harton village, at an estimated cost of £14,650. Mr. W. T. Robson, the manager, reported that it was doubtful whether the extension would pay for itself at first, but the geographical position of South Shields obviously indicated Harton as the only available outlet to a charming, and doubtless in the future, populous suburb, while the scheme would be a distinct move towards connecting up with Sunderland. By 23 votes to 18 the Council decided to defer consideration of the subject until such time as Harton was incorporated within the borough.

## L.C.C. TRAMWAY MATTERS.

EXTENDING THE RETURN TICKET SYSTEM.

At last Tuesday's meeting of London County Council the Highways Committee reported that the through and intermediate return fares charged on the southern tramways had proved popular with the travelling public, and satisfactory from the point of view of the tramway undertaking. Up to the present these return stages had on several routes applied only to journeys which could be made without change of car. Numerous requests had lately been made that return tickets should be issued between places which could only be reached by change of car, and to meet this demand the Committee had now approved eight 3d. return fares and twenty-three 4d. return fares for different journeys in South London, for which changes of cars were necessary.

CENTRAL CAR REPAIR DEPOT.

Eleven tenders had been received from selected firms for the erection of the third section of the central car repair depôt. The tenders varied from £25,600 to £30,750, and the architect's estimate was £27,600. The Committee recommended that the lowest tender, that of Charles Wall, Limited, should be accepted.

The reports were adopted.

## MISCELLANEOUS NEWS AND NOTES.

**London Subway Fare Reduced.**—This week the London County Council tramways department have reduced the fare between Southampton Row and the Victoria Embankment, *viâ* the subway, to one halfpenny.

**Plymouth and Self-Propelled Tramcars.**—The tramways manager has presented a report on self-propelled tramcars, stating that the circumstances in Plymouth were so different that he could not recommend their adoption.

**Railless Trolley Car Experiments at Shanghai.**—The Shanghai Electric Construction Company, Limited, are making trials of railless trolley cars, and if the experiments give satisfaction it is proposed to start a number of services on routes which are too narrow to permit of tramway construction.

**Excess Passengers at Birmingham.**—The decision of the Tramways Committee to allow six persons to stand in a car resulted in considerable criticism, and the committee have now resolved to permit six persons to stand up to 9.30 every morning, on Saturday afternoons from mid-day, and on bank holidays all day.

**Petrol-Electric Vehicle for Pietermaritzburg.**—A 40 h.p. petrol-electric char-a-banc has been ordered by the Pietermaritzburg Council, to be used in testing the traffic value of the various routes in and about the city. According to the Board of Trade Journal the Council do not propose at present to take any further action regarding railless trolley cars.

**Private Railless Traction Scheme at Bournemouth.**—A meeting has been held in the lower Charminster Road district in support of a private proposal to apply for Parliamentary powers to run railless cars in the district, and connecting two tramway termini. It was asserted that the Town Council would neither extend the tramways nor licence omnibuses.

**To Discipline Glasgow Football Crowds.**—It is reported that proceedings may be taken against football followers who enter tramcars by climbing over the dashboard or the staircase railings. Offenders are being reported with a view to prosecutions under the following by-law:—"Every passenger shall enter or depart from a car by the conductor's platform in the rear of the car, and not otherwise."

**Opening of a Newcastle Extension.**—The Tramways Committee on October 24 opened the remaining mile of the tramway extension to Lemington by running cars to and from Lemington to Sandy Banks, Newburn. The Heaton Lemington line was opened last August, but the Board of Trade refused to sanction the running of cars beyond Lemington until the vehicles were fitted with powerful brakes, in view of the short steep gradient at Northumberland Road.

**A "Fortune" for a Seat.**—Replying to an inquiry whether the delegate who attended the Municipal Tramways Conference had gathered any information as to suitable seats for uncovered car tops in wet weather, Councillor Linscott replied that no information had been brought before the Tramways Committee. Two or three seats had been made locally, but when they were put into operation they became inoperative. There was a fortune for anyone who could invent a suitable seat.

**Underground Lines and Surface Trailers for Montreal.**—The Montreal Tramways Company are reported to have informed the City Council that they are prepared to construct underground lines and to give transfer from the surface cars to the underground system. Major Hutchinson, the general manager, has announced that 25 motor cars and trailers will shortly be placed in service. The trail cars will couple up close to the motor car, and special appliance will close the doors and fold in the steps of the trailer, before it will be possible for the car to start.

**Municipal Omnibus Projects.**—Aberdeen Tramways Committee have agreed to apply for powers in the new Provisional Order to run motor omnibuses from Bridge of Don to Tarbothill, near the golf course.—Wolverhampton Tramways Committee recommend that a licence should not be granted to an applicant who desires to run a motor 'bus service between Queen's Square and the borough boundary. It is the intention of the committee to submit at an early date a scheme for such a service on that route.—Lancaster Council have resolved to seek powers to run motor omnibuses in the district.

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**Well-to-do Men Using Workmen's Cars.**—During a discussion by Oldham Tramways Committee on a proposal to give transfers on a certain special car from a factory at workmen's fares, Alderman Greaves spoke of seeing a man in high position in a workmen's car. Councillor Elliot mentioned the case of another man, earning £5 a week who got up earlier than he need to take a workmen's car, and the tramways manager, Mr. Dugdale, referred to another cheap fare man of £10 a week. The manager opposed the idea of transfers, but was directed to consider it and report thereon.

**Passenger's Accident on a Car Platform.**—In the King's Bench on October 23 Mr. C. Burdett, comedian and dancer, claimed damages against the London County Council for personal injuries. Plaintiff's case was that he was alighting from a car when one of his feet caught on the stud on the platform used in connection with the supply of sand to the rails. He was thrown into the road, and as a result suffered injuries to his back. The defendants denied negligence, and said the stud was flush with the platform, and did not cause the fall of the plaintiff. The jury awarded plaintiff £125, and judgment was given accordingly.

**Transit Facilities Required for Trafford Park.**—Mr. Marshall Stevens, chairman of the Trafford Park Estates, Limited, speaking at the annual meeting, stated that the Manchester Corporation Electricity Committee estimated that by their proposed new station in Trafford Park there would be a considerable saving in traffic facilities, so that a year or two's savings would pay for both the land and the facilities. What the Park was most suffering from was the want of tramway connection with Stretford, Urmston, Davyhulme, and Patricroft.—Manchester Council Electricity Committee has decided to apply for authority to purchase the Trafford Park Power and Light undertaking.

**Motor Omnibus Service for Edinburgh.**—A decision was arrived at by the City Council on October 28, by 16 votes to 13, to obtain tenders for three single-deck and three double-deck petrol-electric omnibuses, in order to run a circular four-mile service from West Meadows, foot of Marchmont Road, eastwards to Hope Park, Preston Street, Dalkeith Road to Cameron Bank, Lady Road, Esslemont Road, West Mains Road, Blackford Avenue, Kilgraston Road to starting point on West Meadows. Councillor Harrison, who moved the proposal, estimated the cost of the vehicles at £5,100. The garage would cost £1,500. They had had, he said, various estimates with regard to the loss they would incur. Personally he did not believe the loss would be so great as their financial advisers stated. It was something worth risking a little money for, and it was a necessity for the city to make a forward step in this matter.

**Trail Cars and Motor Omnibuses in Auckland.**—Presiding at the sixteenth general meeting of the Auckland Electric Tramways Company, Mr. C. G. Tegetmeier said that the Public Works Department had approved of the company running coupled cars. This concession would enable them to make a much more effective use of the smaller cars that were sent out in the earlier stages of the undertaking. A request had been made by the exhibition authorities that they should run a service of motor omnibuses in connection with the tramlines, and this the company had agreed to do. Six 'buses had been introduced, and although they did not think there was scope for the profitable operation of omnibuses, yet, if there should be an opportunity in the future of running motor vehicles to advantage, the company was not likely to leave it to others. The dividends announced in our issue dated October 4 were ordered to be paid.

**New Cars for Leicester.**—Ten cars are to be purchased at a cost of £7,000. In moving this at a meeting of the Corporation on October 28, Alderman Flint said that last year the tramways carried the whole population 145 times, and probably this year they would carry them 156 times. The committee, he observed, had recognised the vote of the Council referring back the proposal to fit the new cars for P.A.Y.E. operation. He had taken no part in the controversy on the subject now in progress in the local press, but when talk was indulged in at election meetings as to whether members of the committee were interested financially in the P.A.Y.E. company, he thought he would have the confidence of all his colleagues on the Council in a matter of that sort. An amendment that five of the cars should not be fitted with covered tops was defeated. Alderman Barton remarked that in the bad weather, which lasted eight months in the year, canopy top cars earned more money than open top cars. The former number 50 and the latter 100.

**New and Prospective Work.**—Edinburgh Council on October 28 referred back to the Tramways Committee until April next a scheme to apply for powers for the construction of a tramway from Craiglockhart terminus to Coniston Road, at a cost of £20,000.—It is proposed to extend the existing loop on the Southend Pier tramways by 300ft. and to improve the accommodation at the south station, at a cost of £2,175; and to borrow £600 for the purchase of four additional cars.—A scheme is under consideration by Glasgow Tramways Committee for constructing a tunnel under the hill on which Glasgow University stands, in order to extend the tramways to the residential suburb of Hillhead.—A provisional agreement has been made by Dewsbury Tramways Committee with the National Electric Construction Company for the construction and working of tramways to Dewsbury Moor and Shaw Cross. The Yorkshire (Woollen District) Electric Tramways have offered revised terms upon which that company would be prepared to accept a lease of the tramways to Westborough.—Brighton Council have agreed to rail renewals being made at a cost of £2,750.—Track relaying is to be carried out at Halifax at a cost of £6,300.

## CONTRACTS AND ORDERS.

**Heywood Council** have placed a contract with Mr. Bertram Thomas for alterations to the switchboard at the electricity works.

**Huddersfield Council** have been recommended by the Electricity Committee to accept the tender of Messrs. Switchgear and Cowans, Limited, for a high-tension switchboard, at £2,259.

**Aberdeen Council** have accepted the tender of the Brush Electrical Engineering Company to supply their interpole type of motors for six new cars, and of the British Westinghouse Company for controllers and electrical equipment.

**Mirrless, Bickerton and Day, Limited,** have been awarded a contract for the supply of a Diesel engine and generator at Worthing Corporation electricity works, at £3,785 for the engine and £683 for the generator. The latter will be supplied by Crompton and Co.

**Luton Council** have accepted the following tenders:—Tudor Accumulator Company, Limited, traction battery of 250 cells, £1,137, less approximately £170 for existing battery; Hudson Economiser Company (1907), Limited, cooling tower of 170,000 gallons capacity, £889.

**Salford Council** have allotted contracts to the British Westinghouse Company for the supply of two additional potential transformers on the extra high-tension switchboard, at £42 10s., and to J. Wolstenholme and Son for an additional vertical two stage air compressor at the electricity works.

**Glasgow Electricity Committee** have recommended the Corporation to accept the tender of the American Engineering Company to equip one pair of boilers with their stokers at £1,400 on the understanding that if the stokers do not prove satisfactory the company will remove them free of cost to the Corporation.

**The National Rail and Tramway Appliances Company, Limited,** have contracts in hand at the present time for 70 tons of brake blocks for various Government railways. They are also supplying, among other contracts, brake blocks to the Metropolitan Railway and 7,000 blocks to the London, Brighton, and South Coast Railway.

**Leicester Council** have adopted the following contracts:—J. Chapman and Sons, Limited, of Leicester, builders' work for car repairing shops to be erected in Abbey Park Road, at £1,406; Siemens Brothers Dynamo Works, Limited, building and installing a turbo-generator at Lero electric generating station, with reversible rotary convertors, switchgear, etc., and the installation of a rotary convertor at Aylestone electric generating station, together with the necessary switchgear, at £20,018; Clarke, Chapman, and Co., steam-raising plant necessary in connection with the additional generating plant at Lero station, at £8,212.

## PERSONAL.

**Mr. G. J. Hollyer** has been appointed station superintendent at Walthamstow Council electricity works.

**Mr. F. H. Corson,** electrical engineer to Gloucester Corporation, has been appointed manager of the municipal tramways of that city.

**Mr. W. W. Warren,** charge shift engineer at the London County Council tramway generating station at Greenwich, has resigned his post.

**Mr. G. W. Stevenson** is leaving England for Pernambuco, Brazil, to take up a position with Messrs. J. G. White and Company on the Pernambuco tramways.

**Mr. W. H. Mulhall,** who was formerly associated with Siemens Bros. Dynamo Works, Limited, Dalston Works, as traction lamp expert, has been transferred to the Glasgow branch.

**Mr. Allan B. Field,** chief designer of turbo-electric machinery to the Westinghouse Electric Company, Pittsburg, has been appointed professor of mechanical engineering at the Manchester School of Technology.

**Mr. W. H. Taylor** has resigned the position of assistant electrical engineer at Walthamstow Council electricity works, to accept an appointment as chief station superintendent at the new Government power station at Perth, Western Australia.

**Mr. George W. Chalmers** was elected a director of Hurst, Nelson and Co., Limited, at the annual meeting of the shareholders of their rolling stock and plant works at Glasgow. Mr. Chalmers already held the position of works manager, which he retains.

**Inspector J. Campbell,** Manchester Corporation tramways, has been presented with a silver coffee service by the employees of the Oldham Road branch on the occasion of his retirement. He has also received a clock from passengers on the Rochdale Road section.

**Mr. Henry Criswell,** a native of East Grinstead, who has held an appointment on the engineering staff of the county surveyor for West Sussex, has been appointed chief roads engineer to the Peruvian Government, at a salary of £1,200 per annum. He has had Colonial experience in South Africa and Canada.

**Motorman W. Markham,** Ilford Council tramways, in competition with 300 other exhibitors at the Model Engineer Exhibition at the Horticultural Hall, Westminster, was awarded a bronze medal and certificate for a medical galvanic battery, which he designed and constructed.

**Mr. F. Eggington,** who for some years has been the chief assistant in the West Ham tramways department, has resigned that position in order to take a position under his old chief, Mr. H. E. Blain, of the London Underground Railways. The Tramways Committee have accepted Mr. Eggington's resignation, and are recommending that Mr. Hopkins be appointed to the position at a salary of £250 per annum, rising by annual increments of £25

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to £300. The committee have appointed Mr. A. C. Debenham to be accounts clerk at £200 per annum, rising to £220 by annual increments of £10; and Mr. J. O'Niel to be traffic clerk at £120 per annum, rising by annual increments of £10 to £150. The filling of the post of traffic superintendent, at a commencing salary of £225 per annum, has been left to the tramways manager and the chairman of the Tramways Committee.

**Miss M. Orr,** who for ten years had held the positions of typist and head of the ticket department of the Musselburgh Tramways Company, has been presented with a dressing case on the occasion of leaving the service. Mr. Bentley, works manager, presided, and Mr. Watson, commercial manager, in handing the gift to Miss Orr, stated that the company were sorry to lose her services.

**Alderman J. H. Corke,** Mayor of Portsmouth and chairman of the Tramways Committee, in distributing the awards for the fifth championship walking match of the tramway employees, stated that the committee had endeavoured to brighten the lives of the men in their service to the best of their ability, and when the men had a grievance they were always ready to receive a deputation and talk matters over. They realised that unless the employees were happy in the work in which they were engaged they could not carry out their duties thoroughly or efficiently.

**Tributes to the Oldham Management.**—At the last meeting of the Oldham Tramways Committee for the municipal year, Alderman Greaves moved that thanks be accorded to the chairman and vice-chairman for their services, and said members might congratulate themselves on the successful working of the department. The taking away from them the overseeing of the surveyor's department had been an excellent move. Councillor Calvert, who seconded, said that he considered Mr. Isherwood to be an ideal chairman and spoke of the genial character of the vice-chairman. The Mayor said that the committee had been well manned and the business well managed. Councillor Hardman referred to the great improvement in the running of the cars, and said it was very largely due to the interest the chairman and vice-chairman had taken in the work of the committee. The chairman, responding, said that he was much obliged for the eulogy. They were all, as a committee, trying to conduct the tramways department in the best way they could. Councillor Grime, who is leaving the Council, was accorded a vote of thanks, and in reply he spoke highly of the way in which Mr. Dugdale managed their great business. A profit was being earned and the cars were running to time. The chairman remarked that since March the receipts had gone up by over £4,000 as compared with last year. Mr. Dugdale (the manager): I think we are doing well because we are running to the time-tables.

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**Mr. Alfred S. Giles,** general manager and engineer-in-chief of the Lisbon Electric Tramways Company, has died from enteric fever. He began his career on the engineering staff of the Edison Company, Limited, and afterwards served with Thompson, Ritchie and Co. In 1904, while holding the position of engineer to Blackburn Corporation electricity department he was appointed engineer-in-chief to the Cape Tramways Company, and early in 1911 he was transferred to Lisbon. During his tenure of the latter offices he dealt successfully with labour and revolutionary troubles, and came to be held in high esteem by the staff as well as by the directors of the company.

## FINANCIAL REPORTS AND MEETINGS.

**City of Buenos Ayres Tramway Company.**—The directors announce a dividend of 1s. 3d. per share (5 per cent. per annum) for the three months ended September 30.

**Estimated Cost of Preston Tramways Extensions.**—In the Bill to be promoted by the Corporation next session the following financial particulars are given as to the tramway proposals:—Additional generating plant, £5,000; 10 cars, at £750 each, £7,500; alterations at offices and car shed, £6,000; contingent requirements during next seven years, £6,500.

**The Sale of Cheltenham Tramways.**—A sum between £90,000 and £100,000 is believed to be the price at which the Cheltenham and District Light Railway has been sold to J. G. White and Co., Limited, and Balfour, Beatty and Co., Limited. The length of the system is about 12 miles, and it was opened thirteen years ago at a cost of £120,000. An average dividend of 4 per cent. has been paid annually, and last year it rose to 5 per cent.

**The British Electrical Federation.**—The traffic statement for the week ended October 24, 1913, shows that the receipts from tramways and railways amounted to £39,515, as compared with £36,618 in the corresponding week last year, and from omnibuses £12,689, as compared with £1,204, making a total of £52,204, as compared with £37,822. The tramway and railway route mileage was 429.82, as compared with 428.47. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working both last year and this year, the receipts show an increase of £2,695 upon the week.

**Improved Position at Stalybridge.**—In replying to a vote of thanks to the chairman (Alderman Ridyard) and the deputy-chairman (Alderman Perrin) and to the chairmen and deputy-chairmen of the committees, at the last meeting for the municipal year of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways Board, Alderman Ridyard said that neither the tramways nor the electricity department had ever shown as good results as they did to-day. In the electricity department there was a net profit of £509, and when they compared that with the corresponding period last year, when there was a loss of £90, it meant that they were £600 better off. This had been the same during the whole of the months of the year that were past. Up to the end of the first six months of last year the tramways showed a loss of £6,335; up to the end of September this year (from last March) the loss was only £1,535.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended October 25 amounted to £228,968, or £9,024 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £80 per track mile, an increase of 18s. 3d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

October 31, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, October 31. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 73 2 6 .. | 74 5 0 .. | 75 5 0 |
| " (three months) .. .. | 72 0 0 .. | 73 7 6 .. | 76 0 0 |
| Electrolytic Copper—bars or ingots .. | 77 10 0 .. | 78 0 0 .. | 80 5 0 |
| Aluminium—bars or ingots .. .. .. | 83 0 0 .. | 83 0 0 .. | 83 10 0 |

## COAL MARKET.

October 31, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, October 31. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 .. | 24 6 .. | 22 9 .. | 21 10½ |
| Best Seconds .. .. | 24 0 .. | 23 9 .. | 22 3 .. | 21 3 |
| Ordinary Drys .. .. | 21 3 .. | 21 0 .. | 20 6 .. | 20 0 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 9 .. | 19 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 3 .. | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 .. | 20 0 .. | 17 0 .. | 16 10½ |
| Best Seconds .. .. | 19 6 .. | 19 3 .. | 16 6 .. | 16 3 |
| Ordinary Drys .. .. | 16 9 .. | 16 6 .. | 14 9 .. | 15 0 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 14 6 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. | 14 9 .. | 16 0 .. | 14 0 .. | 10 10½ |
| Best Seconds .. .. | 13 0 .. | 13 0 .. | 13 0 .. | 10 0 |
| Smalls .. .. .. | 8 0 .. | 8 0 .. | 10 0 .. | 5 10½ |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Oct. 28 | £54,912 | £54,630 | 43 | £2,377,081 | +£181,855 |
| Auckland..... (28 days) | Sept. 26 | 18,498 | 19,943 | 13 | 61,553 | + 2,595 |
| Ballarat and Bendigo | Sept. 14 | 821 | 840 | 24 | 20,588 | — 299 |
| Brazilian St. Rly. Mlrs. | Sept. | 42,082 | 50,952 | 8 | 101,353 | + 18,853 |
| Brazilian Traction..... | Oct. 25 | 82,679 | 92,207 | 43 | 3,865,113 | + 64,407 |
| Brisbane ..... | Sep. | 22,700 | 25,690 | 39 | 282,768 | + 51,674 |
| British Columbia .....$ | Sept. | 688,089 | 734,223 | 13 | 2,260,854 | + 247,268 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,078 | + 1,750 |
| Buenos Aires Lacroze.. | Sept. | 43,363 | 44,261 | 39 | 183,945 | + 6,907 |
| Calcutta.....Rs. | Oct. 23 | 55,874 | 59,024 | 43 | 27,72,196 | + 1,31,025 |
| Cape Town ..... | 8-pt. | ... | 11,390 | ... | ... | ... |
| Carthagena & Herrerias | Sept. | 2,982 | 1,344 | 39 | 24,661 | + 5,395 |
| Cordoba..... | Sept. | 11,745 | 13,356 | 26 | 80,725 | + 8,456 |
| East India ..... | Sept. | 1,931 | 2,028 | 8 | 4,083 | + 190 |
| Kalgoorlie..... | Sept. | 3,251 | 3,068 | 39 | 26,447 | — 2,841 |
| La Plata..... | Sept. | 4,153 | 4,528 | 39 | 45,611 | + 9,415 |
| Lima..... | Sept. | 22,660 | 34,110 | 39 | 300,647 | + 23,783 |
| Lisbon ..... Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Oct. 15 | 25,377 | 26,161 | 41 | 510,344 | + 85,831 |
| Melbourne ..... | Sept. | ... | 62,000 | ... | ... | ... |
| Mexico .....$ | Sept. | 587,734 | 604,744 | 39 | 5,116,881 | + 107,699 |
| Montevideo..... | Sept. | 27,711 | 27,870 | 47 | 344,301 | + 26,483 |
| Para ..... | Oct. 27 | 4,910 | 4,318 | 47 | 188,441 | — 550 |
| Port Elizabeth..... | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai .....$ | Oct. 22 | 20,785 | 25,200 | 43 | 986,452 | + 108,383 |
| Singapore .....$ | Oct. 25 | 10,045 | 11,598 | 43 | 514,489 | + 67,815 |
| Toronto .....$ | Sept. | 767,944 | 865,796 | 39 | 7,183,470 | + 962,426 |
| Winnipeg.....$ | Sept. | 309,722 | 331,732 | 39 | 2,981,484 | + 243,982 |

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**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Oct. 22 | £1,383 | £1,453 | + £90 | 21 | £35,653 | + £2,381 |
| Accrington | ,, 22 | 539 | 606 | + 67 | 29 | 16,999 | + 1,610 |
| Ayr Corporation | ,, 25 | 195 | 254 | + 59 | 23 | 11,018 | + 1,494 |
| Bath Electric | ,, 22 | 751 | 898 | + 147 | 43 | 42,357 | + 3,347 |
| Birkenhead Corp. | ,, 26 | 1,112 | 1,187 | + 75 | 30 | 39,019 | + 3,850 |
| Birmingham Corp. | ,, 25 | 10,636 | 12,398 | + 1,762 | 30 | 349,085 | + 29,502 |
| Blackburn Corporation | ,, 22 | 1,123 | 1,457 | + 334 | 30 | 40,522 | + 3,922 |
| Blackpool & Fleetwood | ,, 25 | 321 | 467 | + 146 | 17 | 27,482 | + 4,607 |
| Blackpool Corporation | ,, 23 | 571 | 941 | + 370 | 29 | 70,992 | + 11,374 |
| Bolton Corporation | ,, 26 | 2,467 | 2,606 | + 139 | 30 | 82,869 | + 4,879 |
| Bournemouth Corp. | ,, 29 | 1,566 | 1,785 | + 219 | 30 | 68,854 | + 8,230 |
| Bradford Corporation... | ,, 25 | 5,024 | 5,974 | + 950 | 30 | 180,320 | + 11,326 |
| Brighton Corporation... | ,, 26 | 856 | 946 | + 90 | 30 | 36,127 | + 2,509 |
| Bristol | ,, 24 | 6,823 | 7,457 | + 634 | 42 | 345,005 | + 47,387 |
| British Elec. Federatn. | ,, 24 | 36,618 | 39,515 | * | ... | ... | ... |
| Burnley Corporation | ,, 25 | 1,437 | 1,676 | + 239 | 30 | 51,964 | + 6,301 |
| Burton-on-Trent Corp. | ,, 26 | 266 | 272 | + 6 | 30 | 8,859 | + 422 |
| Bury Corporation | ,, 26 | 1,222 | 1,324 | + 102 | 31 | 41,336 | + 1,665 |
| Cardiff Corporation | ,, 11 | 2,440 | 2,689 | + 249 | 28 | 77,947 | + 8,626 |
| Chatham and District.. | ,, 23 | 829 | 941 | + 112 | 42 | 39,575 | + 2,503 |
| Chesterfield Corp. | ,, 23 | 235 | 256 | + 21 | 29 | 7,716 | + 955 |
| Colne & Trawden | ,, 25 | 244 | 267 | + 23 | 43 | 11,878 | + 759 |
| Cork Electric | ,, 23 | 453 | 479 | + 26 | 42 | 21,354 | + 530 |
| Croydon Corporation ... | ,, 17 | 1,758 | 1,616 | — 142 | 28 | 48,895 | — 5,079 |
| Darlington Corporation | ,, 25 | 228 | 246 | + 18 | 30 | 7 538 | + 753 |
| Derby Corporation | ,, 25 | 870 | 963 | + 93 | 30 | 30,000 | + 3,211 |
| Dover Corporation | ,, 25 | 214 | 227 | + 13 | 30 | 8,072 | + 162 |
| Dublin & Lucan | ,, 24 | 116 | 110 | — 6 | 16½ | 2,672 | — 9 |
| Dublin United | ,, 24 | 5,334 | 4,329 | — 1,005 | 42 | 236,376 | — 12,781 |
| Dundee City | ,, 22 | 1,165 | 1,278 | + 113 | 23 | 30,718 | + 2,349 |
| East Ham Corporation | ,, 25 | 1,053 | 959 | — 94 | 30 | 30,478 | — 1,641 |
| Exeter Corporation | ,, 24 | 294 | 336 | + 42 | 30 | 10,789 | + 524 |
| Gearless Motor 'Buses. | ,, 25 | ... | 595 | ... | 29 | 14,546 | ... |
| Glasgow Corporation ... | ,, 25 | 18,917 | 21,041 | + 2,124 | 21 | 424,412 | + 31,121 |
| Glossop(U.Elec.Supply) | ,, 25 | 118 | 126 | + 8 | 43 | 5,607 | + 591 |
| Halifax Corporation ... | ,, 21 | 1,911 | 2,219 | + 308 | 29 | 63,896 | + 1,520 |
| Hastings & District..... | ,, 23 | 834 | 911 | + 77 | 43 | 46,104 | + 3,365 |
| Huddersfield Corp. | ,, 25 | 1,806 | 2,114 | + 308 | 30 | 64,762 | + 4,240 |
| Hull Corporation | ,, 25 | 2,930 | 3,160 | + 230 | 30 | 91,104 | + 5,274 |
| Ilford U.D.C. | ,, 25 | 374 | 442 | + 68 | 30 | 13,710 | + 1,304 |
| Ilkeston Corporation ... | ,, 29 | 114 | 123 | + 9 | 31 | 4,181 | + 680 |
| Ipswich Corporation ... | ,, 25 | 380 | 423 | + 43 | 30 | 14,696 | + 599 |
| Isle of Thanet | ,, 25 | 342 | 408 | + 66 | 4 | 1,774 | + 176 |
| Kilmarnock Corp. | ,, 25 | 162 | 175 | + 13 | 23 | 4,220 | + 292 |
| Lanarkshire | ,, 23 | 1 622 | 2,057 | + 435 | 42 | 72,022 | + 9,013 |
| Lancashire United | ,, 22 | 1,342 | 1,698 | + 356 | 42 | 65,730 | + 7,777 |
| Leeds City | ,, 25 | 7,402 | 8,169 | + 767 | 30 | 250,578 | + 16,596 |
| Leicester Corporation... | ,, 25 | 2,582 | 2,837 | + 255 | 43 | 120,538 | + 11,301 |
| Leith Corporation | ,, 25 | 618 | 674 | + 56 | 23 | 17,190 | + 730 |
| Leyton U.D.C. | ,, 16 | 1,224 | 1,300 | + 76 | 28½ | 39,193 | — 622 |
| Liverpool Corporation.. | ,, 25 | 11,654 | 12,742 | + 1,088 | 43 | 552,335 | + 42,247 |
| Llandudno & Colwyn B. | ,, 24 | 181 | 195 | + 14 | 47 | 16,871 | + 1,433 |
| London County Council | ,, 22 | 41,737 | 43,378 | + 1,641 | 29 | 1,235,505 | — 6,498 |
| London Gnl. Omnibus.. | ,, 25 | 55,229 | 61,329 | + 6,100 | 43 | 2,677,577 | + 494,447 |
| London United | ,, 24 | 5,709 | 6,194 | + 485 | 43 | 272,666 | + 4,570 |
| Lowestoft Corporation | ,, 25 | 175 | 197 | + 22 | 3 | 729 | + 36 |
| Maidstone Corporation | ,, 23 | 179 | 216 | + 37 | 30 | 6,407 | + 396 |
| Manchester Corp. | ,, 25 | 16,190 | 17,673 | + 1,543 | 30 | 530,341 | + 27,145 |
| Met. Elec. Trys. | ,, 24 | 8,589 | 9,181 | + 592 | 43 | 389,240 | + 12,902 |
| Nelson Corporation | ,, 25 | 198 | 206 | + 8 | 30 | 6,460 | + 387 |
| N'castle-on-Tyne Corp. | ,, 25 | 4,772 | 5,441 | + 669 | 30 | 145,910 | + 13,616 |
| Newport (Mon.) Corp... | ,, 25 | 707 | 754 | + 47 | 30 | 23,167 | + 1,845 |
| New St. Helens & Dist.. | ,, 22 | 711 | 799 | + 88 | 17 | 14,835 | + 1,673 |
| Northampton Corp | ,, 24 | 504 | 550 | + 46 | 30 | 17,712 | + 1,211 |
| Nottingham Corp. | ,, 23 | 3,181 | 3,315 | + 134 | 29½ | 100,201 | + 4,534 |
| Oldham Corporation ... | ,, 26 | 2,024 | 2,196 | + 172 | 31 | 68,906 | + 4,534 |
| Portsmouth Corp. | ,, 25 | 1,725 | 2,085 | + 360 | 30 | 72,947 | + 4,540 |
| Preston Corporation ... | ,, 22 | 807 | 834 | + 27 | 30 | 26,779 | + 1,597 |
| Provincial | ,, 25 | 1,609 | 1,741 | + 132 | 4 | 6,648 | + 486 |
| Reading Corporation ... | ,, 23 | 590 | 704 | + 114 | 29 | 20,881 | + 1,484 |
| Rochdale Corporation | ,, 25 | 1,465 | 1,625 | + 160 | 30 | 49,111 | + 1,999 |
| Rotherham Corp. | ,, 29 | 845 | 1,006 | + 161 | 30 | 30,362 | + 7,423 |
| Salford Corporation ... | ,, 27 | 4,733 | 5,061 | + 328 | 30 | 158,378 | + 6,703 |
| Sheffield Corporation... | ,, 26 | 6,831 | 7,307 | + 476 | 31 | 225,312 | + 19,579 |
| Southampton Corp. | ,, 22 | 1,123 | 1,261 | + 138 | 29 | 40,493 | + 2,392 |
| Southend-on-Sea Corp. | ,, 22 | 606 | 791 | + 185 | 30 | 31,694 | + 5,361 |
| South Met. Trys. | ,, 24 | 782 | 1,081 | + 299 | 43 | 39,593 | + 3,056 |
| South Shields Corp. | ,, 25 | 624 | 668 | + 44 | 30 | 22,099 | + 2,819 |
| Sunderland Corp. | ,, 25 | 1,295 | 1,327 | + 32 | 30 | 44,418 | + 4,765 |
| Sunderland District ... | ,, 22 | 493 | 549 | + 56 | 51 | 28,736 | + 4,942 |
| Swindon Corporation ... | ,, 22 | 174 | 169 | — 5 | 29 | 5,024 | + 351 |
| Trys. (M.E.T.) 'Buses | ,, 25 | ... | 8,953 | ... | 39 | 198.157 | ... |
| TynesideTrys.&Tmrds | ,, 22 | 645 | 717 | + 72 | 17 | 9.157 | + 625 |
| Wallasey Corporation | ,, 25 | 972 | 1,134 | + 162 | 30 | 38.097 | + 3,655 |
| Walsall Corporation ... | ,, 25 | 561 | 623 | + 62 | 43 | 26,735 | + 1,915 |
| Walthamstow U.D.C.... | ,, 25 | 603 | 715 | + 112 | 30 | 22,304 | + 401 |
| Warrington Corp | ,, 16 | 433 | 458 | + 25 | 29 | 12,777 | + 440 |
| West Ham Corporation | ,, 23 | 2,599 | 2 713 | + 114 | 29 | 81,070 | + 2 :84 |
| Wigan Corporation ... | ,, 25 | 1,484 | 1.618 | + 134 | 29½ | 44,075 | + 4,509 |
| Wolverhampton Corp | ,, 29 | 998 | 1.047 | + 39 | 31 | 33,431 | + 1,916 |
| Yorkshire (W. Riding | ,, 26 | 1.195 | 1.347 | + 152 | 43 | 62,372 | + 6,729 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,695 upon the week.

# ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Oct. 25 | £5,584 | £5,501 | — £83 | 43 | £207,276 | + £7,157 |
| City and South London | ,, 25 | 3,226 | 3,067 | — 159 | 43 | 119.674 | — 11,280 |
| Liverpool Overhead | ,, 26 | 1,541 | 1,645 | + 104 | 43 | 73.783 | + 5,614 |
| London Electric | ,, 25 | 14,435 | 14,245 | — 190 | 43 | 581.695 | + 1,250 |
| Mersey | ,, 25 | 2.355 | 2,318 | — 37 | 43 | 96.248 | + 4,972 |
| Metropolitan | ,, 26 | 16,646 | 18,103 | + 1,457 | 43 | 737,279 | + 23,224 |
| Metropolitan District... | ,, 25 | 13,228 | 13,462 | + 234 | 43 | 555,514 | + 17,871 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, October 31. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 70 — 75 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4½ — 4¾ |
| 5 | Do. 5½% Cum. 2nd Pref. | + ⅛ | 4⅜ — 4⅝ |
| 100 | Do. 4% Deb. Stk. Red. | + ⅛ | 91¼ — 93½ |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 96½ — 98½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 98½ —100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 —102 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref | ... | 2⅛ — 2⅜ |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13¼ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref ... | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co, Lim. | — ⅛ | 86 — 88 xd |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ ,, |
| 5 | Do. do. 5% Cum. Pref | — ⅛ | 4⅞ — 5⅛ ,, |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | — 1 | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | — ⅛ | 6¾ — 7⅛ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —103 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | ... | 120 —124 |
| 100 | Do. Pref. Ord. Stock | — 2 | 107 —111 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock. | ... | 99 —102 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 97 —100 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. | + 1 | 90 — 93 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | ... | 86 — 89 |
| 100 | Do. 7% Non-Cum. Pref. | ... | 48 — 51 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 12½ — 14½ |
| 100 | Do, Deferred Ord. Stock | ... | 4 — 6 |
| 100 | Do. 5% Perpetual Debenture Stock | ... | 91 — 94 |
| 100 | Do. 4½% Second Debenture Stock, Red | — 2 | 75 — 78 xd |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. | — ⅛ | 6⅛ — 6⅝ |
| 5 | Do do. 5% Cum. Pref. | ... | 5 — 5¼ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., | ... | ⅞ — 1⅛ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs. Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5⅛ — 5⅜ |
| 100 | Do. 4% Debenture Stock Red, 1935 | — 2½ | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 93½ — 95½ xd |
| 100 | Companhia Ferro Carrildo Jardim Botanico, 5% 1st Mt. | ... | — 8⅛ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 10⅜ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | + ⅛ | — 11⅝ |
| 100 | Do. do. 6% Pref. | ... | — 82 |
| 100 | Do. do. "A" Red. | ... | — 79 |
| 100 | Do. do. Deb. Stock "B" Red. | ... | 9 — 9½ |
| 10 | Gateshead & Dist Trys. Co., Ord. | + ¼ | ⅜ — ⅝ |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | ¼ — ¾ |
| 1 | Do, do. 6% Cum Pref. | ... | 66 — 71 |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 94½ — 98½ |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 87 — 92 |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 3½ — 4¼ |
| 10 | Imperial Tramways, Ord. | ... | 6¼ — 6¾ |
| 10 | Do. do. 6% Cum. Pref. | ... | 17 — 18 |
| 100 | Do. do. 4½% Deb. Stock | — ½ | 2⅛ — 2⅜ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 73 — 78 |
| 100 | Do. 4% Debenture Stock | ... | 0 — 1/16 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | — 3/32 | 85 — 90 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 10 — 20 |
| 100 | Do. do. 6% "B" do. | ... | ⅞ — 1 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 9¾ — 10¼ |
| 10 | Lanarkshire Tramways Co. | ... | 77 — 81 |
| 10 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 1 — 1¼ |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1⅝ — 1⅞ |
| 1 | Do. 6% Cum Pref. | ... | 91 — 96 |
| 100 | Do. 5% Mort. Debs. | ... | ¾ — ⅞ |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | 95 — 97 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 86 — 88 |
| 100 | Do. Do 5% Cum, Inc. Deb. Stk. Red. | — 1 | 58 — 62 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | — 1 | 101 —103 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 4¼ — 5⅛ |
| 5 | Do, do. 6% Cum. Pref | ... | 87 — 89 |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 108 —111 |
| $100 | Manila Electric R. R. and Lighting Corp. Capital Stk. | — ½ | 96¼ — 98½ |
| $1,000 | Do. do. 5% Bds. | ... | 1⅝ — 1⅞ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 83 — 86 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 86 — 89 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 78 — 82 xd |
| $100 | Mexico Tramways Co., Common Stock | — ⅛ | 77½ — 82½ |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 1 | 84 — 88 |
| 100 | Do. 6% 50-yr. Mort. Bonds | — 1 | 93 — 95 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | ... | 97 — 99 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | + 1 | 1⅛ — 1⅜ |
| 1 | National Steam Car Co. Ltd | ... | 6 — 6½ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | — ⅛ | 5⅞ — 6⅛ |
| 10 | Do. do. 5% Cum. Pref. | ... | 5½ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 4¼ — 5⅛ |
| 5 | Do, do. 6% Cum. Pref. | ... | 1⅛ — 1⅜ |
| 1 | Perth (W.A.) Elec Trams.. Ld., Ord. | ... | ⅝ — ¾ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | ⅞ — 1⅛ |
| 1 | Do. 5% Cum Pref | ... | 82 — 85 |
| 100 | Do. 4½% Debenture Stock, Red. | ... | 11/32 — 15/32 |
| 1 | Provincial Tramways, Lim., Ord. | — 2½ | 95 — 98 xd |
| 10 | Do. 5% 1st Deb. Stock | ... | 83 — 86 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 5 — 5½ |
| 5 | Rangoon Elec. Trams. & Supply Co. 6% Cum. Pref. | ... | 94 — 96 |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 83 — 85 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | — |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | 98½ —101½ |
| $500 | 1st Mt. 30-yr 5% Gold Bonds | ... | 88½ — 90½ |
| 100 | 5% 50-yr. Mort Gold Bonds | ... | 100 —103 |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 99 —102 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | + 1 | 10¼ — 11⅛ |
| 10 | Shanghai Elec. Construction Co. | ... | 86 — 90 |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | ⅜ — ½ |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 68 — 73 |
| 100 | Do. do. 4% Deb. Stk. | ... | 93 — 95 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 97 — 99 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 86 — 88 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 92 — 95 |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | + ½ | 4⅞ — 5⅛ |
| 5 | United Elec. Tramways of Monte Video, Ord. | — ⅛ | 5 — 5⅜ |
| 5 | Do. do. 6% Cum. Pref. | ... | 98½ — 96½ xd |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | — 3½ | 98½ —100¼ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | ¼ — ⅛ |
| 5 | Yorkshire (West Riding) Elec Trys. Co., Ord. | ... | 3½ — 4 |
| 5 | Do. do. 6% Cum Pref. | + ⅛ | 80 — 86 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. | + ⅛ | |

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THE

# Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### LONDON GENERAL OMNIBUS COMPANY, LTD.

TENDERS FOR STORES.

The London General Omnibus Company, Limited, invite tenders for the supply during the year 1914 of the following Stores :—

A. Timber.
B. Ironmongery, Coachmakers' and Builders'.
C. Motor Department Stores (various).
D. Colours.
E. Glass and Sundries.
F. Coach Trimmings, Canvas.
G. Leather and Machine Belting.
H. Brushes and Brooms.
K. Building Materials.
L. Gas and Water Fittings.
M. Enamelled Iron Plates.

The schedules may be obtained at the Office of the Purchasing Agent, Electric Railway House, Westminster, S.W., on November 11 and 12, between the hours of 10 a.m. and 4 p.m., or on application per post. A charge of 2s. 6d. (which is not returnable) is made for each schedule.

The samples will be on view at the Company's Premises, Felsham Road, Putney, on November 18 and 19 only, between the hours of 10 a.m. and 4 p.m., where schedules (2s. 6d. each as above) may be obtained during the exhibition of the samples.

Contractors are requested to call and examine the samples before tendering.

Services of the Company's motor omnibuses run past the top of Felsham Road, near Depôt.

Sealed tenders, endorsed "Tenders for Stores," should be addressed to the Purchasing Agent, Electric Railway House, Westminster, S.W., and must reach this address not later than 10 a.m. on Wednesday, November 26, 1913.

### ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS

The Agent-General for Victoria is prepared to receive tenders for the following Apparatus for use in connection with the signalling on the Melbourne Suburban Railways :—

(1) Track Feed Boxes, including Signal Transformers, Switchgear and Accessories.
(2) Track Resistances.
(3) Impedance Bonds.
(4) Track Relays and Relay Boxes.

Tenders can be submitted for any section individually or for all four.

Specifications and forms of tender may be obtained from the Agent-General for Victoria on or after Monday, November 10, 1913. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specifications may apply to the Consulting Engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for one set in duplicate of the four specifications above mentioned is £5 5s. The charge will be the same for any part of a set. Further single sets or parts of sets will be charged for at the rate of £2 2s. per single set or part of a set. Sums paid for copies will be refunded on receipt of a *bonâ-fide* tender for the whole or any complete section of the work.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways: Tenders for Signal Apparatus," are to be addressed to the Agent-General, and delivered at his office in Melbourne Place, Strand, W.C., not later than 12 noon on Monday, December 22, 1913.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required by the contractor whose tender is accepted.

### CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery, and erection at their Stuart Street Generating Station of Two Water-Tube Boilers and Superheaters, Economisers, Coal Chutes, Ash Conveyor, Pipe Connections, additional Stoker Shafting, and Clutches, and Pneumatic Ash Handling Plant to Boiler House No. 2.

Specification, drawings, and form of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of two guineas, which amount will be refunded on receipt of a *bonâ-fide* tender.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Friday, November 28, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
November 3, 1913.

### COUNTY BOROUGH OF WOLVERHAMPTON.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply, delivery, and erection of

One 1,000 kw. Rotary Converter Set.

Specifications and form of tender may be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained upon payment of five shillings for each copy.

Tenders, addressed to the undersigned, must be sealed with wax and endorsed "Tender for Rotary Converter," and delivered not later than noon on Monday, November 24, 1913.

The lowest or any tender will not necessarily be accepted.

S. T. ALLEN,
Chief Engineer and General Manager.

Electricity Offices,
Commercial Road, Wolverhampton,
November 5, 1913.

### NOTICE.

CONSTRUCTION AND EXPLOITATION OF A RAILWAY.

The "Junta Geral" of the District of Ponta Delgada, Saint Michael's, Azores, represented by its Administrative Committee, makes known that, being duly authorised by the Law of the 26th June, 1913, published in the "Diario do Governo" (Official Gazette) of the Portuguese Republic, No. 149, of the 28th of that month, it will open a Competition, for a period of ninety days, to run from the first publication of the aforesaid "Diario," for the Construction and Exploitation of an Electric Railway, to be laid, as far as may be possible, on the sideways, roadways and beds of the national and municipal highways, between Ponta Delgada and the Valley of the Furnas, and Ponto Delgada and the town of Ribeira Grande. The bases of the contract and the respective programme and conditions will be on view at

"The Portuguese Consulate" in London, and at

Messrs. Wm. Hooton and Yates, 12, Fenchurch Street, E.C., where all explanations will be given, only the Portuguese version published in the "Diario do Governo," being valid for all effects.

Secretariate of the Junta Geral of the District of Ponta Delgada, Saint Michael's, Azores.—30th September, 1913. The Administrative Committee.—Manuel Jacintho da Ponte, President.—Filigenio Pimentel, Vice-President.—Joao Candido Borges.—Antonio Joaquim Fernandes.—Members.

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## POSITIONS VACANT.

### COUNTY OF LONDON.

CHARGE SHIFT ENGINEER AT THE GREENWICH GENERATING STATION.

The London County Council invites applications for the position of Charge Shift Engineer at the Greenwich Electricity Generating Station in the Tramways Department at a salary of £250 a year, rising by annual increments of £10 to £300 a year.

Members of the Council's staff are not precluded from making application for the appointment. Candidates must be not less than 28 and not more than 40 years of age, and have had experience in the running and maintenance of high-tension electrical plant, steam turbines, and water-tube boilers.

Applications must be made on the official forms, which may be obtained, together with a statement of the conditions upon which the appointment will be held, from the Clerk of the Council, County Hall, Spring Gardens, S.W., to whom the application forms must be returned not later than 11 a.m. on Wednesday, November 12, 1913.

All communications on the subject must be marked on the envelope "Charge Shift Engineer," and a stamped addressed foolscap envelope must be enclosed. The canvassing of members of the Council will be held to be a disqualification for the appointment.

JAMES BIRD,
Deputy Clerk of the London County Council.

County Hall, Spring Gardens,
October 23, 1913.

### COUNTY BOROUGH OF WEST HAM.

TRAFFIC SUPERINTENDENT.

The Council invite applications from qualified persons for the position of Traffic Superintendent of their Tramways, at a commencing salary of £225 per annum.

The person appointed will be responsible to the Tramways Manager for the proper and efficient working of the Traffic Department, including the ticket and cash branches.

Applications, in candidate's own handwriting, stating age, experience, and present position, together with copies of three recent testimonials, must be addressed to Mr. J. S. D. Moffet, Tramways Manager, Tramway Offices, Greengate Street, Plaistow, E., not later than 10 a.m. on Wednesday, November 12, 1913.

H. W. GREAVES,
Town Clerk.

Town Hall, West Ham,
October 29, 1913.

### ROYAL BURGH OF KIRKCALDY.

TRAMWAYS DEPARTMENT.

Wanted at once an experienced Overhead Linesman Apply, giving qualifications and references, to

O. F. FRANCIS,
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Kirkcaldy.

*(Continued on page 403.)*

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BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

**Established in 1892 and Published by**

*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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**One Shilling per Single Copy.**

**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, NOVEMBER 8, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## TRACK AND ROAD MAINTENANCE.

Councillor Moxon, the chairman of Newport Tramways Committee, is well advised in following up at this juncture the recent recommendations of the officials of that department and the borough surveyor as to renewal and repair of the track. He has introduced an important suggestion, not only for the carrying out of the work, but for the maintenance of the remainder of the thoroughfares in which the lines are laid. As he observed in a letter addressed to the Works and General Purposes Committee, his suggestion, if carried out, should result in the task being done in the best and most economical manner. In many large towns the responsibility is assumed either by the Tramways Committee or by the Highways Committee, thus doing away with divided control, and Mr. Moxon's suggestion is that the whole of the eight miles of thoroughfares in which there are tramways should be taken from the Works and General Purposes Committee and handed over to a new Committee to be known as the Highways Committee. It would be formed of two members each from the present Committee, the Tramways and the Waterworks Committees, with the surveyor and the electrical engineer as the officials jointly responsible to such Committee. All work would be carried out on the joint recommendation of those officials, and should they differ the decision would rest with the Committee. No difficulty would be met with in apportioning the cost between the tramways undertaking and the borough funds. It is to the lack of so well-defined an arrangement as that now submitted by the chairman of the Tramways Committee, and to the alleged absence of proper supervision of the construction of the track that Mr. Moxon attributes the present unsatisfactory state of affairs; while the work done by direct labour previous to June, 1912, has, he adds, given little, if any, more satisfactory results. It is to be hoped that contentions will induce the Committee whom he addresses to bring his suggestions into operation without delay. The time is opportune, for on November 10 the various Committees have to be re-appointed for the ensuing year. That the matter is an urgent one is shown by the fact that since the date mentioned above the sum of £7,869 has been spent upon repairs and £3,317 upon renewal of track, while more than three-quarters of the track still requires attention. A further idea of the urgency of the problem is afforded by Mr. Moxon when he says that he appreciates "that from the Works Committee's point of view it would not be either satisfactory or desirable that the Tramways Committee should execute repairs to the portion of the roads occupied by the track which necessitates corresponding alterations to the road surface on each side of the track. It is an unfortunate fact that, speaking generally, the then existing levels of the road were adopted as the level of the track when it was first laid, with the result that there are excessive dips in it, preventing smooth running and causing portions of the track to become waterlogged, and its life impaired and shortened. The question of the removal of these dips when the track is reconstructed has to be considered from two aspects—viz., the effect upon the remainder of the road surface, and also the increased cost of maintenance and renewal if the dips are continued." It is only fair to the Works Committee to mention that the statements made respecting the track were considered by that Committee on October 30, when the Committee had the officials responsible for the work before them, and were satisfied that there was no ground for the complaints so far as they are concerned. The Committee, the chairman states, repudiated, therefore, the allegations as to inefficient and faulty work.

## KEEN TRAFFIC COMPETITION IN LONDON.

In our last issue reference was made to the fact that after a long period of decreasing revenue, owing to growing motor-omnibus competition, the London County Council Tramways are now showing increased receipts every week as compared with last year, the increases running up to as much as £2,000 per week. An examination of the weekly traffic returns of all the undertakings devoted to local passenger transportation in London reveals the remarkable fact that at the present time the only agency whose revenues are on the up-grade is the tramways. This improvement, moreover, is not confined to the system worked by the County Council, for most of the tramways round the county of London, whether worked municipally or by companies, now show moderate increases in receipts as compared with the corresponding weeks last year. During last winter and spring three of the underground railway companies associated with the Underground Electric Railways Company of London still recorded increases in their traffic receipts, while the fourth, the City and South London, continued to show decreases. The last-mentioned still falls away, as it is very badly hit both by tramway and omnibus competition. About August last the increases of the Metropolitan District, the London Electric and the Central London Railways began to diminish, and now their returns frequently show decreases in receipts as compared with last year. It is to be noted as peculiar that this decline coincided with the turn of the tide in the tramway receipts. Yet the one

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fact can hardly be directly connected with the other, because the three railways mentioned are not very much affected by tramway competition. The competition which does affect them is that of the motor omnibus, and in the present irony of fate that vehicle also is controlled by the Underground Electric Railways Company. But another circumstance is worthy of note. In the earlier half of the present year the weekly receipts of the London General Omnibus Company showed enormous advances, owing to the constant increase in the number of vehicles and in the number and mileage of routes over which they run. These increases are now coming near an end, and correspondingly the amounts of the weekly increments in receipts compared with last year are becoming less. The last return showed an increase of less than £2,000. Yet this is the time when the railway returns are becoming less favourable. The reductions announced in fares on the railways will not affect the tramways nearly so much as they will the omnibuses, and it will be very interesting to note the progress of events during the next few months. The most important reductions are on City and South London fares, which have in many cases up till now been on the old basis of a penny per mile. The competition between railway and omnibus promises to be very keen. The public in the meantime at least get the benefit. In considering prospects, the view must probably be that the railways have the stronger position. The omnibuses use an expensive fuel, which is likely to become still dearer. They may be called upon to contribute towards the maintenance of the streets which they use, and to carry workmen at unremunerative fares as the tramways and railways have to do at present. These burdens would be a serious matter for the omnibuses. Then various connecting lines and extensions for the railways are in progress, and these will be of great advantage. Altogether, the advantage seems to be with the railways as against the omnibuses, but the latter have also a big field where railways do not compete. In any event, the tramways have a good prospect of going on comfortably, as it is tolerably clear that the omnibus competition has nearly reached its maximum, and the tramway revenues are going up.

## TRAMCAR AND OMNIBUS INSPECTION.

In the report of the Commissioner of Police of the Metropolis for the year 1912, issued on October 31, it is stated that 249 motor omnibuses were rejected during the year by the Noise Committee, the vehicles not coming up to the standard required in respect to quiet running. Most of them, after the necessary alterations had been made, were subsequently brought up to the requisite standard and passed. The number of cases and the class of vehicles reported for being unduly noisy after being licensed during 1912 were :—Motor omnibuses, 7,677; electric tramway cars, 2,684; and motor cabs, 353; a total of 10,714. This, compared with 1911, shows on the whole a slight decrease, motor omnibuses being 775 less, whilst electric tramway cars increased by 462 and motor cabs by 128.

The total number of licences issued for cabs and stage carriages during 1912 exceeded those issued in 1911 by 81, the numbers for 1911 and 1912 respectively being 16,476 and 16,557. Of this number horse-drawn carriages again show a decrease being 1,402 less than in 1911. This decrease is made up of 487 hansoms, 475 four-wheeled cabs, 410 horse-drawn omnibuses, and 30 horse-drawn tramway cars. Against these decreases must, however, be set a total increase of 1,483 in mechanically-propelled vehicles, made up of 343 motor cabs, 940 motor omnibuses, and 194 electric tramway cars.

In great measure the increase in the number of motor cabs is attributed to drivers procuring their own cabs—generally on a hire-purchase agreement. The increase in the number of motor omnibuses is referred to as showing "that the popularity of this class of vehicle has by no means decreased. This continuance of popularity may also be due to the fact that many extensions of route have been made to places of resort in the outer part of the Metropolis." Among the carriages licensed in 1912 there were 2,363 new vehicles, of which only three were horse-drawn, the remainder being mechanically-propelled. The number of taximeters tested during the year was 24,623, of which 437 were rejected as being unfit from various causes.

During the year under review vehicles of all kinds killed 538 persons in the street—over a hundred more than in 1911. Of these 331 were victims of motor vehicles of various kinds, the deaths of 167 being attributed to the motor omnibus. Tramcars were responsible for only 37 deaths. Motor vehicles of all kinds injured 8,630 people, the motor omnibus being responsible for 2,580. The total number of persons injured by tramcars was less in 1912 than in 1911, while the number injured by motor omnibuses was doubled in the same period. Of the 538 killed in the streets, 273 were between the ages of 15 and 60.

## ELECTRIC TRACTION IN THE UNITED STATES

Highly interesting statistics are published in the "McGraw Electric Railway Manual" (New York) regarding electric tramways and railways in the United States. The totals for the present year show the great development which has been reached by undertakings of the kind. The expression electric railways in America includes electric tramways on streets and roads as well as electric lines on their own right of way. The latter class embraces inter-urban lines, city lines both underground and elevated, and the electrified sections of steam railway undertakings. It appears that there are in the United States 1,115 electric railway companies owning 43,044 miles of track and working 93,946 cars. The total amount of capital stock and bonds authorised is no less than £1,826,330,000, of which the amount issued is £1,117,170,000. Taking the States in groups, the two most important are the Eastern States and the Central States. The former have 396 companies with 12,952 miles of track, and 34,048 cars. The figures for the latter are 321 companies, 15,089 miles of track, and 27,075 cars.

## L.C.C. TRAMWAY MATTERS.

PROPOSED NEW LINES.

At last Tuesday's meeting of the London County Council the Highways Committee reported that they had considered the question of the construction of new tramways in respect of which it was desirable that the Council should seek Parliamentary authority in the session of 1914. The Committee were satisfied that the construction of a number of tramway sections to consolidate and link up the existing system was necessary and closely concerned the future of the tramway undertaking, but the failure which had attended the efforts of the Council in the past to obtain some of these powers made it desirable to proceed with the utmost care. They were now considering the preparation of a comprehensive scheme for the linking up and the extension to approved traffic points of the present tramway system, but it would not be possible, owing to the great amount of work which would have to be done in the matter to present a complete scheme in time for submission to Parliament in 1914, but they hoped to do so for the following session. They were now limiting their recommendations to the following schemes, which were either special in character, or involved little expenditure compared with the advantages to be derived from them. The Committee hoped that the Council would be successful in obtaining the consents of the road authorities, so that the schemes might be considered by Parliament. Practically the whole of the routes would be double track, and particulars of length and estimated cost are as follow :—

(1) From the present terminus in Farringdon Road (Charles Street) to a point near Ludgate Circus *viâ* Farringdon Road and Farringdon Street, 5 fur. 6 chains, estimated cost, £23,820.

(2) From the present terminus at Aldgate to a point near Mark Lane Station *viâ* Mansell Street and Tower Hill, 1 mile 2 fur. 4 chains, estimated cost, £29,135.

(3) From the present terminus at Aldgate to Aldgate Station, 1 fur. 4.5 chains, estimated cost, £5,800.

(4) From Lee Green to Eltham *viâ* Eltham Road and High Street, 3 miles 5 fur. 6 chains, estimated cost, £67,125.

Total length of all proposed extensions in single track, 5 miles 7 fur. .5 chains, estimated cost, £125,880.

The estimates do not include the cost of cars, car sheds, substations, or sites for buildings, as expenditure under these heads is as a rule common to more than one route. The existing car sheds would be utilised. It was accordingly recommended that authority be sought in the next session of Parliament for the construction of these lines.

The Finance Committee stated that they had been informed by the Improvement Committee of proposals to be submitted in regard to street widenings in connection with schemes 2 and 4. The total estimated cost of construction and equipment, excluding street widenings and any proportion of power station expenditure, amounted to £148,530. The estimated cost of the proposed street widenings was £57,700, making a total expenditure of £206,230. The Highways Committee had stated that scheme 4, which involved considerable expenditure on widenings, was required owing to the rapid development of the district and to the need for direct tramway communication between Eltham and other parts of London, and for the purpose of linking up the existing tramways from Woolwich to Eltham with the tramways at Lee Green, thus abolishing two dead-end termini. Though the financial results of working

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this line were estimated to show a large adverse balance it was considered that the construction would induce additional traffic on adjacent routes for which no allowance was made in the estimate of financial results.

Consideration of the proposals was adjourned.

SUPPLY OF DRIVING WHEEL CENTRES.

The Highways Committee had considered the following tenders for the supply of 200 cast-steel driving wheel centres for electric cars :—

| Price each delivered to | Depots in London | Siding in Truck. |
|---|---|---|
| | £ s. d. | £ s. d. |
| Societe Anonyme Usines et Aciéries Allard, Belgium | 1 4 6 | 1 4 6 |
| Usines Gustave Boel, Belgium .. .. .. | 1 5 2 | — |
| British Griffin Chilled Iron and Steel Co. .. .. | †1 10 0 | — |
| Estler Bros. (Belgian Manufacture) .. .. .. | 1 12 0 | 1 12 0 |
| Soc. Anon. Aciéries et Fonderies d'Art de, Haine-Saint-Pierre et Metallurgique .. .. .. | 1 14 3 | 1 14 0 |
| National Steel Foundry .. .. .. | 1 17 6 | 1 16 9 |
| Fried. Krupp Aktiengeselschaft, Essen-Buhr .. | †2 2 0 less 2½ per cent. | — |
| Hadfield's Steel Foundry Company .. .. .. | 2 3 3 | 2 3 3 |
| Springfield Steel Company .. .. .. .. | 2 6 0 | 2 6 0 |
| John Baker and Co. .. .. .. .. .. | †2 7 6 | †2 7 6 |
| Medway Steel Company .. .. .. .. | 26 10 0 | 26 0 0 |
| | A ton. | A ton. |
| Glasgow Railway Engineering Co. .. .. .. | 2 15 0 | 2 15 0 |
| Hurst, Nelson and Co. .. .. .. .. | 3 2 6 | 3 0 0 |
| Thos. Firth and Sons .. .. .. .. .. | 3 10 0 | — |
| R. B. Tennent, Limited .. .. .. .. | 3 10 6 | 3 10 0 |

† Not to specification.

The Committee had recommended for acceptance the lowest tender, that of the Société Anonyme Usines et Acieries Allard.

Consideration of this report was also adjourned.

ENAMEL FOR PLOUGH BASES.

For some time experiments had, the Highways Committee reported, been carried out with preservatives for treating plough bases in substitution for the compound at present in use, which was affected by heat and was inflammable. So far the most satisfactory results had been obtained from a special heat-resisting grey enamel supplied by Pinchin, Johnson and Company. This enamel was a good insulator, and this property made it still more suitable for the purpose required. Having regard to the good results of the experiments, the Highways Committee were of opinion that it was desirable to treat all the plough bases in use with the enamel at the earliest possible moment, particularly in view of the approach of winter, and they had accepted the offer of Pinchin, Johnson and Company to supply 500 gallons of the enamel at 8s. 6d. a gallon. The Council approved this action.

## NEW TRAMWAY AND RAILLESS PROJECTS.

BOLTON.—Powers to provide and run omnibuses are being applied for by Bolton Corporation.

BOURNEMOUTH.—Next year the Council will make application for powers to extend the tramways in Charminster Road. Consideration is also to be given to the question of extensions in other districts.

BRIERLEY HILL.—The Councils of Brierley Hill and Quarry Bank have agreed to ask Messrs. Balfour, Beatty and Co. to state when they intend carrying out the terms of the order transferred to them for the making of the light railway from Brierley Hill through Quarry Bank to Cradley Heath. There is said to be a great need for the proposed line.

BURLEY-IN-WHARFEDALE.—Leeds Corporation have informed the Burley-in-Wharfedale Council they are applying for powers to run railless trolley cars from Guiseley terminus to Burley.

NORWICH.—The Tramways Company intend to obtain powers for the construction of several tramways in the city and also an extension to the village of Thorpe.

PRESTON.—Application will be made next session for powers to extend the tramways to places inside and outside of the borough, to run motor omnibuses within the borough, and to borrow money for future requirements in the way of additional cars, car shed extension, and additions to the generating station.

SKEGNESS.—Application will be made by the District Council for an Act authorising them to run mechanically-propelled vehicles by means of overhead wires and other apparatus.

SOUTH-WEST SUSSEX.—The Light Railway Commissioners on October 4 held an inquiry at Chichester into the application of the Selsey Tramways Company for authority to reconstruct the existing tramway under the Light Railway Act, and to extend the existing line to the east bank of Chichester Harbour, affording access to the shipping there, and to East Wittering. The latter place is expected to develop in the near future as a seaside resort. At Itchenor it is proposed to erect a jetty, which at certain times could be used by vessels of 800 tons burthen. The Commissioners decided to grant the Order.

SOUTH YORKSHIRE.—Mr. Stephen Sellon, of Westminster, is the engineer to the scheme of joint tramway and electric lighting proposals by the Councils of Wombwell, Wath, Bolton, and Thurnscoe, and Mr. J. B. Hamilton has also been consulted. For the tramway part of the scheme, which relates to a distance of 15 miles, application is being made to the Light Railway Commissioners. On one route it is proposed to obtain powers to connect with High Street, Mexborough, over a portion of the road granted for trackless cars to the Mexborough and Swinton Tramways Company.

## THE LATE BARON ZIFFER.

We record with deep regret the death of Heir Ingenieur Emanuel A. Ziffer, Edler von Teschenbruck, a title with many others he had earned through his extraordinary services as President for many years to the Austrian Union of Tramways and Light Railways and to many of the companies affiliated to it. He was a prolific writer on technical subjects, and was well known to all participants in Tramway Congresses for many years past. He was one of the original members of the Permanent International Tramways Union, and the earnest and enthusiastic way in which he worked in the development and advancement of all light railway and tramway matters was remarkable. His untiring energy never flagged until his last illness, and only recently he was actively pursuing his professional work. He suffered but a short time, and died on October 27 last at his residence in Vienna. He was buried two days later in the central cemetery in the presence of many of his old friends and admirers.

## MISCELLANEOUS NEWS AND NOTES.

**Standing Compartments.**—Bombay City Council have agreed to allow the Tramways Company to introduce two "standing" compartments in its bogie cars for a period of three years from January, 1914, to provide accommodation for passengers during the crowded hours of traffic.

**The Diesel Engine Users' Association.**—A meeting of this new Association will be held on Wednesday, November 12. Any engineer interested in the running of Diesel engines may obtain full particulars as to membership, etc., from the honorary secretary, Mr. A. C. Gilling, Electricity Works, Epsom, Surrey.

**Suggested Linking Up of East London Tramways.**—Stepney Council has decided to urge the London County Council to obtain Parliamentary powers with a view to linking up the tramways north and south of the Thames by way of the Rotherhithe Tunnel, through which, at the present time, there is no passage for the travelling public.

**Through Running from London.**—Bexley Council have authorised their tramways manager to confer with the chief officer of the London County Council tramways with reference to the through running of cars between London, Bexley, and Erith, in place of the present arrangement of the Bexley cars running to Beresford Square, Woolwich.

**An Abandoned Route.**—At the last October meeting of Liverpool Corporation Councillor Blair moved in favour of the reconsideration of the proposal of the Tramways Committee to abandon the Smithdown Road and Park Lane route. The loss on it last year was £411, and so far this year only £170, and the receipts per car mile were higher than on the Wavertree first-class cars. The amendment was lost.

**Preston in Need of Additional Cars.**—Councillor Crompton, chairman of the Tramways Committee, informed the Council on October 30 it was essential that at least six more cars should be purchased in the immediate future. The car sheds would need to be enlarged and the generating plant increased. The reduction of the three-halfpenny fare to a penny on the Penwortham route had been a financial success.

**Rawtenstall Cars and Regenerative Control.**—The Councils of Accrington, Haslingden, and Rawtenstall have agreed to continue the present 10-minutes service of cars from 2 o'clock each day for one year, on condition that the Rawtenstall Corporation will forego its claim for the payment of the difference in current consumption, alleged to arise through the use of the regenerative system of control on Rawtenstall cars running through Haslingden.

**The Henley Wiring System.**—Henley's Telegraph Works Company, Limited, have issued an illustrated price list of wires and accessories dealing with the Henley Wiring System. Special features are the universal bonding clamp, the tee and joint boxes, and the rawplugs. The system continues to meet with favour wherever it is used. Electrical engineers speak highly of it, and it has been installed in practically every type of building.

**Concrete Tramway Standards.**—In reply to a request from Grimsby Urban Council for steel tramway standards to be used at Immingham instead of ferro-concrete pillars, the Tramways Company's engineer has stated that the ferro-concrete pillars had been ordered and the order could not be cancelled. He hoped that the objection, which might be a sentimental one, would be waived. The Council decided to ask the company to erect steel poles in conformity with their agreement.

**Trail Cars Sanctioned for Aberdeen Suburban Tramways.**—Replying to the observations of Aberdeen Tramways Committee in regard to the application by the Aberdeen Suburban Tramways Company for permission to run trailer cars on their tramway lines, the Board of Trade have stated that they see no sufficient reason to object to the use of trailer cars on the tramways as proposed, provided suitable arrangements for turning were made at the Woodside and Mannofield termini.

**Greenock and Tramway Municipalisation.**—At the October meeting of Greenock Council the members by a majority declined to postpone consideration of a motion that the Council should give notice to the Tramways Company to terminate their lease at the first break, namely, May 15 next. Ex-Bailie Mitchell thereupon intimated that he would not proceed with the notice of the motion which he had given to that effect. On November 1 a meeting of ratepayers passed a resolution in favour of municipalisation, but as the result of the municipal election, the advocates of purchase are in a minority.

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**The Position at Oxford.**—By a small majority the General Purposes Committee of Oxford Corporation have decided to recommend the acceptance of the National Electric Construction Company's scheme for running petrol-electric cars in the chief thoroughfare and overhead electric tramcars and motor omnibuses in the other streets. The company, however, are to be asked not only to reaffirm formally their liability to penalties from August in last year, but to pay over the sums already alleged to be forfeited.

**Municipal Election Speeches.**—The past few weeks brought a flood of oratory dealing with tramways by candidates seeking election at the polls on November 1. The *Yorkshire Daily Observer*, referring to the advocates of halfpenny fares in Bradford says:—"It is idle for a candidate to claim special support from the electors on the mere ground that he favours the cheapening of this or that municipal service unless at the same time he shows that he has considered the practical means of realising the ideal."

**Damages for Ejecting a Passenger.**—In the Court of Session, Edinburgh, judgment was given on October 23 against Glasgow Corporation for £50 as damages to a tramcar passenger. An altercation took place about the car having run past the stopping place, the result being that the driver and conductor unsuccessfully tried to eject him, and later on a policeman was called on to the car, and took his name and address. For the defence it was pleaded that the action of the conductor and driver was justifiable on account of the offensive language in which the pursuer indulged. It was denied that there was any assault. Plaintiff claimed £250, but accepted £50 offered by the Council.

**Single or Double Track at Rotherham?**—On October 31 the Town Council decided that double track should be laid in place of the single track on the Effingham road section. The Tramways Committee advised the relaying of the single line, and that a similar course be followed with respect to the track in Fitzwilliam Road. Alderman Winter, chairman of the committee, who was unable to be present, wrote stating he was of opinion that, considering the present state of the finances of the borough, the Council would not be justified in expending the additional £6,000 required for a double track. By 23 votes to 5 the Council decided upon a double track for this section also.

**Cardiff Employees' Alternative Spread-Over Duties Scheme.**—The Tramways Committee have adopted a proposal to increase the pay of labourers to 6½d. per hour, fitters' helpers 6¾d. per hour, and that the minimum rate of motormen be 6d. per hour, rising by half-yearly instalments of ¼d. per hour to a maximum of 7d. Conductors have an increase of ½d. per hour. The men's union asked that conductors should have another increase of ¼d. next January. The sub-committee contended that this was not reasonable, as it would mean an increase of ¾d. an hour within a period of two months. The scheme of spread-over duties had been revised. The sub-committee mentioned that the alternative scheme put forward by the men's union to eliminate 30 out of the 163 duties required for the Saturday traffic would involve the employment of between 50 and 60 additional men in order to work only a few hours on Saturdays, and the additional cost in wages to those men would amount to between £2,500 and £3,000 per annum. This they could not recommend the committee to agree to. Three representatives of the men appeared before the Tramways Committee, and Sir John Courtis informed them that they were at liberty to see the management at any time, and they were also invited to bring forward any alternative proposals that would not involve the department in great additional expense.

**Unreasonable Attitude of Dundee Tramwaymen.**—Because Mr. Peter Fisher, the tramways manager, is experimenting with a scheme which enables something like a thousand extra seats to be provided for the travelling public at the busy hours of the day, the union employees have passed a resolution generally condemning the proposed new relief table. In a statement which the general manager has issued with the consent of the chairman of the Tramways Committee, he says:—"Under the new system the longest 'spread-over' is 13 hours and 25 minutes, and that only occurring on Saturdays. There are one or two other 'spread-overs' of about 13 hours, but they were for Saturdays also. On another route the 'spread-overs' on Mondays and Thursdays extended to about 13 hours. The Board of Trade have laid it down that an ideal system should provide that no 'spread-overs' exceed 14 hours. The new relief tables have been handed to the men to go over during the next three weeks while they will be on trial. We have asked the men to advise me whether improvements can be effected, and if we find any suggestions they make practicable they will be reproduced." To an interviewer Mr. Fisher said:—"I want to know what it is they want. We have met them on the question of the 'spread-overs.' If they tell us specifically what they want, I have no doubt we will be able to satisfactorily meet them." Mr. Fisher was asked to give a few comparisons of other towns in regard to the extent of the "spread-overs," and from a long list in his possession he took a few towns casually. One town had 265 duties of between 16 and 17 hours and 97 between 15 and 16; another town smaller than Dundee had seven duties with "spread-overs" of between 18 and 19 hours; another 15 duties of 16 and 17 hours.

**Jury's Recommendation in the Tyneside Collision.**—At Wallsend on October 30 the inquest was concluded on the body of William Amis, tramcar conductor, who died as the result of the collision in a fog on October 18 between a trolley wagon containing tramway workmen and an empty passenger tramcar. The driver of the former vehicle said he saw a car six or seven yards from him, and on the same line. He immediately shut off the power, applied his brake and sand, and sounded his gong. He pulled up his car within its length. The cars collided just as they had almost stopped. Witness was travelling at a speed of about eight miles an hour. He did not feel the impact, and he remembered nothing more until he came to his senses while he was still standing on his car. Mr. F. H. Briggs, resident engineer of the Tyneside Tramways Company, said that Linkhorn and Amis were steady and experienced men. He found that the brake had been applied on both cars excepting the hand brake of the trolley car. Sand had been applied by both vehicles. Where there were obstructions to the view of drivers there were indicators at curves between the loops, but on the Gosforth track these indicators were not necessary. A verdict of "Accidental death due to a collision in a dense fog" was returned, and the jury recommended that indicators be placed on all single lines between loops throughout the system.—On November 3 the inquest was concluded on the body of Robert Walton, a motorman, who was killed in the collision. The jury returned a verdict of "Accidental death," but considered that the driver of the repair tramcar deserved censure, because of his mistake in supposing the single line would necessarily be clear. The jury considered that both cars were being driven too fast considering the foggy weather.

## CONTRACTS AND ORDERS.

**Chamberlain and Hookham, Ltd.,** have received a contract for meters from Ipswich for 10 amperes and upwards.

**London County Council** have accepted the tender of Charles Wall, Limited, Chelsea, for the erection of the third section of the tramway central car repair depôt at £25,690.

**W. A. Stevens, Limited,** Victoria Street, Westminster, have supplied a petrol-electric omnibus to Leeds Corporation tramways. It has been placed in service between Moortown and Shadwell.

**J. G. White and Company** are carrying out the construction of the electric tramway and lighting systems in Pernambuco, Brazil, for Dodsworth and Co., of Rio de Janeiro. English cars will be used, but the power plant and the rails are of American manufacture.

**The Tudor Accumulator Company, Limited,** recently added six plates to each cell of the battery at Pontypridd generating station. Mr. J. E. Teasdel, the engineer, in reporting on the work stated that the battery was on load again on the fourth day, and that in view of the heavy demands it was a good thing that they were able to get the work done so expeditiously.

**London County Council** have accepted the following tenders:—A. and F. Manuelle and John Fyfe, Limited, 275 tons each of Aberdeen granite paving setts, at 36s. 0d. a ton; A. and F. Manuelle, 150 tons of Guernsey granite paving setts, at 35s. a ton; Pinchin, Johnson and Company, 500 gallons of heat-resisting grey enamel for plough bases, 8s. 6d. per gallon.

**Manchester Corporation** have approved of the following tenders:—E. Green and Sons, Limited, renewal and replacement work to economisers at Bloom Street Station; British Thomson-Houston Company, Limited, the Brush Electrical Engineering Company, Limited, and Siemens Bros. Dynamo Works, Limited, requirements of lamps during the period ending June 30 next; Ferranti, Limited, h.t. switchgear; Johnson and Phillips, Limited, cable.

## PERSONAL.

**Mr. C. B. Cripps** has resigned his position with the London County Council tramways department to take an appointment under the Aldershot District Council.

**Mr. R. W. Smith-Saville,** borough surveyor and engineer to Darwen Corporation, has delivered a striking address as president of Darwen Literary Society.

**Councillor A. Sinclair,** chairman of the Swansea Electric Lighting and Tramways Committee, was re-elected to the Council on November 1. He has seen sixteen years' service.

**Mr. S. C. Marengo,** sub-manager of the Buenos Ayres and Pacific Railway Company, has, says the *Review of the River Plate*, resigned that position, having been appointed general manager of the Central of Buenos Ayres Railway Company and the Lacroze Tramways Company.

**Motorman Gamble,** of the Birmingham tramways, has been presented with a guinea at a meeting of the Tramways Committee by the Lord Mayor, who complimented him for a plucky act. A little girl ran in front of his car, whereupon Gamble applied the brakes, but realising that it was not possible to stop the car in time he jumped off, and dragged the child away just in time to prevent an accident. Gamble himself ran considerable risk, and he received a slight injury. The matter was reported to the trustees of the Carnegie Hero Fund, but they are reluctant to intervene in the case of a municipal employee, believing that the municipality should make the acknowledgment of such acts of courageous conduct.

**Councillor Rodgers,** chairman of Newcastle Tramways Committee, is being nominated for a vacant seat on the aldermanic bench on Monday next, after 19½ years' service as a councillor. In addressing a meeting on November 5 Councillor Rodgers said the tramways carried the population four times over per week, which was done by no other city with the exception of Glasgow. They had taken £2,014 on the Westerhope 'buses, and had carried 227,665 passengers. The omnibuses had also proved an admirable feeder to the cars, and the routes concerned had shown increased receipts by £20 a week. Although to concede halfpenny fares at present would do away with the profit on the tramways, such fares would ultimately come, although not before a lot of the present debt on the system had been cleared off.

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**Mr. Vincent Edwards,** assistant engineer and manager of the Hastings and District Tramways Company, in the unavoidable absence of Mr. T. B. Holliday, the engineer and manager, discharged the task of thanking the audience and artistes at an entertainment given in aid of the widow and children of a motorman who had died suddenly. The concert resulted in a balance of £75 being raised.

**Mr. Charles Vernier,** the new chairman of the Newcastle-on-Tyne local section of the Institution of Electrical Engineers, is 36 years of age. Before taking up his present position with the Newcastle-on-Tyne Electric Supply Company he was from June, 1899, to the end of 1900 an assistant engineer of the Cork Electrical Tramways and Lighting Company. He received this appointment from Mr. Charles H. Merz, who was then chief engineer to the company.

**Mr. F. H. Corson,** who, as already announced, has been appointed manager of Gloucester tramways while retaining his position as borough electrical engineer, was highly spoken of by the Electricity Supply and Light Railways Committees in the joint report in which they recommended the appointment. The report pointed out that Mr. Johnson, the late manager, was in receipt of a salary of £350 a year, and Mr. F. H. Corson, who had been engineer and general manager of the electricity works since 1909, received £400 per annum and was allowed to take one pupil. Mr. Corson had rendered most efficient service in connection with the electricity undertaking, and was well qualified to undertake the general management of both undertakings. He was willing to undertake the dual duties subject to the appointment of a traffic manager under his supervision and control. The committees also advised that the track repair and maintenance should be entrusted to the Streets Committee, subject to the adjustment of expenses, and that the electricity and light railways undertakings should be placed under the management of a single committee.

## FINANCIAL REPORTS AND MEETINGS.

**New St. Helens and District Tramways Company.**—The net profits for the year ended June 30, including £901 brought forward, were £4,422. There has been transferred to the reserve £1,000, and a dividend of 2½ per cent. has been declared on the preference shares, leaving arrears of 50½ per cent., and £1,424 carried forward.

**Norwich Electric Tramways Company.**—The Hon. Arthur Brand, who presided at the 17th annual meeting on October 29, remarked with pleasure on the facts that the tramways had done better than in the previous year, and that there had been a very considerable increase in the earnings. He mentioned that it was intended to promote a Bill in Parliament to make further improvements in the system. A dividend of 3 per cent. for the year was sanctioned. Mr. Chamberlain was re-appointed representative director for the city of Norwich, and Mr. Hopkins, retiring director, was re-elected.

**A Rating Question at Salford.**—In an appeal heard at Salford Quarter Sessions against the assessment of the tramways in Eccles, at the instance of Salford Corporation, the Court decided to treat the tramways in Eccles as an integral part of the whole system in considering what a hypothetical tenant would look at in dealing with the tramways. Therefore they dismissed the appeal with costs. Mr. Sutton, on behalf of the appellants, asked the Court to state a case, but the application was declined, the chairman remarking that the decision was based on a question of fact and not of law.

**The British Electrical Federation.**—The traffic statement for the week ended October 31, 1913, shows that the receipts from tramways and railways amounted to £38,701, as compared with £36,403 in the corresponding week last year, and from omnibuses £12,240, as compared with £1,337, making a total of £50,041, as compared with £37,740. The tramway and railway route mileage was 420.82, as compared with 428.47. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working both last year and this year, the receipts show an increase of £2,029 upon the week.

**Cape Electric Tramways Company.**—At the annual meeting of the Cape Electric Tramways, Limited, held on November 5 in London, Mr. Ludwig Breitmeyer, who presided, said that the twelve months under review had shown a steady expansive development in regard to their systems at Cape Town and Port Elizabeth. Last year they had increased their passenger traffic by nearly 1,000,000, and their receipts by about £8,000 beyond the figures of the previous year. This year these figures had again been topped, inasmuch as they carried about 1,500,000 more passengers, with an increase in receipts of about £12,000. Up to now the first quarter of the current year showed an increase in receipts of £2,000 as compared with the same period in 1912, and he had every reason to anticipate that such proportionate increase would be maintained. The report was adopted, and a dividend of 5 per cent. on the ordinary shares was declared. The chairman mentioned that Greater Cape Town had now been brought into being. Sufficient knowledge had been gained to convince the board that for a regular town service motor omnibuses were not required. The service to the docks, where the company possessed no tramway, had shown poor results, and would be discontinued if it were not better patronised. So far as they could see, however, motor omnibuses answered well in suburban districts as feeders for the tramways, and also for pleasure traffic on certain routes round the Peninsula.

*(Continued from page 398.)*

**ASSISTANTS.**

Required Assistants, with thorough experience of street passenger-carrying traffic; should be men with decided organising ability and initiative and competent to deal with traffic problems without supervision. Write, stating age, experience, and salary expected, to Box 4801, Willings, 125, Strand, W.C.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended November 1 amounted to £226,804, or £13,602 more than in the corresponding week last year, while the track mileage was 2,802, or 80 more than for the corresponding week. The receipts were at the rate of £79 4s. 11d. per track mile, an increase of £2 11s. 8d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

November 7, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, November 7. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 69 5 0 .. | 73 2 6 .. | 75 10 0 |
| ,, ,, (three months) .. .. | 68 12 6 .. | 72 0 0 .. | 77 0 0 |
| Electrolytic Copper—bars or ingots .. | 75 0 0 .. | 77 10 0 .. | 81 0 0 |
| Aluminium—bars or ingots .. .. .. | 83 0 0 .. | 83 0 0 .. | 83 10 0 |

## COAL MARKET.

November 7, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, November 7. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 0 .. | 25 0 .. | 22 9 .. | 22 0 |
| Best Seconds.. .. .. | 24 3 .. | 24 3 .. | 22 3 .. | 21 3 |
| Ordinary Drys .. .. | 21 3 .. | 21 3 .. | 20 6 .. | 20 3 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 19 9 .. | 19 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 3 .. | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 6 .. | 20 6 .. | 17 0 .. | 17 0 |
| Best Seconds .. .. | 19 9 .. | 19 6 .. | 16 6 .. | 16 3 |
| Ordinary Drys .. .. | 16 9 .. | 16 9 .. | 14 9 .. | 15 3 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 0 .. | 14 0 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 12 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 .. | 14 9 .. | 14 0 .. | 11 0 |
| Best Seconds .. .. | 13 0 .. | 13 0 .. | 13 6 .. | 10 0 |
| Smalls .. .. .. | 7 6 .. | 8 0 .. | 10 6 .. | 5 10½ |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Nov. 4 | £50,685 | £59,167 | 44 | £2,436,198 | +£190,217 |
| Auckland..... (28 days) | Sept. 26 | 18,498 | 19,045 | 13 | 61,553 | + 2,595 |
| Ballarat and Bendigo | Sept. 21 | 865 | 861 | 25 | 21,749 | — 303 |
| Brazilian St. Rly. Mlrs. | Sept. | 42,082 | 50,952 | 8 | 101,353 | + 18,853 |
| Brazilian Traction..... | Nov. 1 | 85,839 | 90,398 | 44 | 3,955,511 | + 68,966 |
| Brisbane ..... | October | 23,017 | 27,250 | 43 | 260,018 | + 55,907 |
| British Columbia .... $ | Sept. | 688,069 | 734,283 | 13 | 2,260,854 | + 247,268 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Bueno- Aires Lacroze.. | October | 44,660 | 45,579 | 17 | 179,524 | + 7,826 |
| Calcutta.....Rs. | Nov. 1 | 56,008 | 57,802 | 44 | 28,26,928 | + 1,32,819 |
| Cape Town ..... | 8-pt. | ... | 11,290 | ... | ... | ... |
| Carthagena & Herrerias | October | 2,376 | 1,582 | 43 | 26,213 | + 4,601 |
| Cordoba ..... | Sept. | 11,745 | 13,356 | 26 | 80,725 | + 8,456 |
| East India ..... | October | 1,911 | 1,878 | 13 | 5,911 | + 147 |
| Kalgoorlie..... | Sept. | 3,251 | 3,068 | 39 | 26,447 | — 2,341 |
| La Plata..... | October | 5,008 | 4,920 | 43 | 50,431 | + 9,327 |
| Lima..... | Sept. | 22,660 | 34,110 | 39 | 300,647 | + 23,788 |
| Lisbon ..... Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Oct. 31 | 24,103 | 26,389 | 43 | 536,733 | + 38,117 |
| Melbourne ..... | October | ... | 65,000 | ... | ... | ... |
| Mexico ..... $ | Sept. | 587,734 | 604,744 | 39 | 5,116,931 | + 107,899 |
| Montevideo..... | Sept. | 27,711 | 27,870 | 47 | 344,301 | + 26,483 |
| Para..... | Nov. 2 | 4,477 | 3,897 | 48 | 192,338 | — 1,131 |
| Port Elizabeth..... | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai ..... $ | Oct. 29 | 20,486 | 24,400 | 43 | 960,852 | + 112,947 |
| Singapore ..... $ | Nov. 1 | 9,981 | 11,265 | 44 | 525,754 | + 68,599 |
| Toronto ..... $ | Sept. | 767,944 | 865,796 | 39 | 7,183,470 | + 962,426 |
| Winnipeg..... $ | Sept. | 309,722 | 331,732 | 39 | 2,981,434 | + 243,382 |

**DICK, KERR & CO.,**
**Limited,**
**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**
**ENGINEERS & CONTRACTORS.**

**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation | Oct. 29 | £1,467 | £1,434 | + £27 | 22 | £37 093 | + £2,409 |
| Accrington Corp. | ,, 29 | 535 | 580 | + 45 | 20 | 17,579 | + 1,655 |
| Ayr Corporation | Nov. 1 | 193 | 254 | + 61 | 24 | 11,272 | + 1,556 |
| Bath Electric | Oct. 29 | 736 | 799 | + 63 | 44 | 43,155 | + 3,410 |
| Birkenhead Corp. | Nov. 2 | 1,368 | 1,431 | + 163 | 31 | 40,450 | + 4,013 |
| Birmingham Corp. | ,, 1 | 11,092 | 12,486 | + 1,394 | 31 | 361,572 | + 30,896 |
| Blackburn Corporation | Oct. 29 | 1,163 | 1,319 | + 156 | 31 | 41,841 | + 4,673 |
| Blackpool & Fleetwood | ,, 25 | 321 | 467 | + 146 | 17 | 27,482 | + 4,607 |
| Blackpool Corporation | ,, 30 | 649 | 700 | + 51 | 30 | 71,692 | + 11,539 |
| Bolton Corporation | Nov. 2 | 2,570 | 2,790 | + 220 | 31 | 85,660 | + 5,099 |
| Bournemouth Corp. | ,, 5 | 1,620 | 1,794 | + 174 | 31 | 70,649 | + 8,404 |
| Bradford Corporation | ,, 1 | 5,494 | 6,067 | + 573 | 31 | 186,387 | + 11,899 |
| Brighton Corporation | ,, 2 | 869 | 943 | + 74 | 31 | 37,070 | + 2,583 |
| Bristol | Oct. 31 | 6,956 | 7,602 | + 646 | 43 | 352,608 | + 48,033 |
| British Elec. Federatn. | ,, 31 | 37,740 | 50,941 | * | ... | ... | ... |
| Burnley Corporation | Nov. 1 | 1,509 | 1,739 | + 230 | 31 | 53,703 | + 6,531 |
| Burton-on-Trent Corp. | ,, 2 | 266 | 280 | + 14 | 31 | 9,139 | + 436 |
| Bury Corporation | ,, 2 | 1,246 | 1,350 | + 104 | 32 | 42,687 | + 1,769 |
| Cardiff Corporation | Oct. 18 | 2,424 | 2,648 | + 224 | 29 | 80,595 | + 8,850 |
| Chatham and District | ,, 30 | 829 | 895 | + 66 | 43 | 40,469 | + 2,598 |
| Chesterfield Corp. | ,, 23 | 235 | 256 | + 21 | 29 | 7,716 | + 955 |
| Colne & Trawden | Nov. 1 | 257 | 270 | + 13 | 44 | 12,148 | + 772 |
| Cork Electric | Oct. 30 | 459 | 499 | + 40 | 43 | 21,853 | + 570 |
| Croydon Corporation | ,, 24 | 1,718 | 1,603 | — 115 | 29 | 49,998 | — 5,193 |
| Darlington Corporation | Nov. 1 | 222 | 249 | + 27 | 31 | 7 787 | + 779 |
| Derby Corporation | ,, 1 | 875 | 921 | + 46 | 31 | 30,921 | + 3,257 |
| Dover Corporation | ,, 1 | 211 | 224 | + 13 | 31 | 8,296 | + 175 |
| Dublin & Lucan | Oct. 31 | 132 | 117 | — 15 | 17½ | 2,789 | — 24 |
| Dublin United | ,, 31 | 5,445 | 4,727 | — 718 | 43 | 241,103 | — 13,429 |
| Dundee City | ,, 29 | 1,293 | 1,261 | + 58 | 24 | 31,980 | + 2,407 |
| East Ham Corporation | Nov. 1 | 1,086 | 946 | — 140 | 31 | 31.676 | — 1,603 |
| Exeter Corporation | Oct. 31 | 300 | 332 | + 33 | 31 | 11,121 | + 556 |
| Gearless Motor 'Buses | Nov. 1 | ... | 488 | ... | 30 | 15,034 | ... |
| Glasgow Corporation | ,, 1 | 19,147 | 21,097 | + 1,950 | 22 | 445.508 | + 32,977 |
| Glossop(U.Elec.Supply) | ,, 1 | 124 | 129 | + 5 | 44 | 5,737 | + 596 |
| Halifax Corporation | Oct. 28 | 1,776 | 2,026 | + 250 | 30 | 65,922 | + 2,070 |
| Hastings & District | ,, 30 | 793 | 882 | + 90 | 44 | 46.986 | + 3,454 |
| Huddersfield Corp. | Nov. 1 | 1,950 | 2,099 | + 149 | 31 | 66,841 | + 4,381 |
| Hull Corporation | ,, 1 | 3,034 | 3,182 | + 148 | 31 | 97,285 | + 5,422 |
| Ilford U.D.C. | ,, 1 | 388 | 433 | + 45 | 31 | 14,143 | — 1,259 |
| Ilkeston Corporation | ,, 5 | 110 | 127 | + 17 | 32 | 4,309 | + 698 |
| Ipswich Corporation | ,, 1 | 395 | 411 | + 16 | 31 | 15,107 | + 615 |
| Isle of Thanet | ,, 1 | 337 | 390 | + 53 | 5 | 2,163 | + 228 |
| Kilmarnock Corp. | ,, 1 | 154 | 170 | + 16 | 24 | 4,330 | + 308 |
| Lanarkshire | Oct. 30 | 1 596 | 1,924 | + 328 | 43 | 73,946 | + 9,342 |
| Lancashire United | ,, 29 | 1,289 | 1,566 | + 277 | 43 | 67.322 | + 8,054 |
| Leeds City | Nov. 1 | 7,972 | 8,209 | + 237 | 31 | 258,787 | + 16,984 |
| Leicester Corporation | ,, 1 | 2,601 | 2,777 | + 176 | 44 | 123,316 | + 11,500 |
| Leith Corporation | ,, 1 | 612 | 686 | + 74 | 24 | 17,876 | + 804 |
| Leyton U.D.C. | Oct. 23 | 1,291 | 1,322 | + 31 | 29½ | 49,515 | — 531 |
| Liverpool Corporation | Nov. 1 | 12,171 | 13,026 | + 855 | 44 | 265,361 | + 43,113 |
| Llandudno & Colwyn B. | Oct. 31 | 158 | 178 | + 20 | 48 | 17.049 | + 1.453 |
| London County Council | ,, 29 | 41,243 | 41,639 | + 396 | 30 | 1,277,144 | — 6,101 |
| London Gnl. Omnibus | Nov. 1 | 56,999 | 58,728 | + 1,729 | 44 | 2,733,305 | + 496,176 |
| London United | Oct. 31 | 5,568 | 5,841 | + 273 | 44 | 278.508 | + 4,845 |
| Lowestoft Corporation | Nov. 1 | 183 | 203 | + 20 | 4 | 933 | + 57 |
| Maidstone Corporation | Oct. 30 | 171 | 187 | + 16 | 31 | 6,595 | + 412 |
| Manchester Corp. | Nov. 1 | 16,975 | 17,752 | + 777 | 31 | 548,093 | + 28,284 |
| Met. Elec. Trys. | Oct. 31 | 8,396 | 8,797 | + 401 | 44 | 398,038 | + 13,304 |
| Nelson Corporation | Nov. 1 | 187 | 201 | + 14 | 31 | 6.661 | + 401 |
| N'castle-on-Tyne Corp. | , 1 | 4,495 | 4,999 | + 504 | 31 | 150,910 | + 14,121 |
| Newport (Mon) Corp. | ,, 1 | 705 | 796 | + 91 | 31 | 23.964 | + 1,935 |
| New St. Helens & Dist. | Oct. 29 | 696 | 749 | + 53 | 18 | 15.584 | + 1,732 |
| Northampton Corp | ,, 31 | 507 | 551 | + 44 | 31 | 18,283 | + 1,255 |
| Nottingham Corp. | ,, 30 | 3,126 | 3,297 | + 171 | 30½ | 103,498 | + 4,705 |
| Oldham Corporation | Nov. 2 | 2,023 | 2,299 | + 276 | 32 | 71,205 | + 4,810 |
| Portsmouth Corp. | ,, 1 | 1,856 | 1,982 | + 126 | 31 | 74,929 | + 4,666 |
| Preston Corporation | Oct. 29 | 772 | 837 | + 65 | 32 | 27.616 | + 1,663 |
| Provincial | Nov. 1 | 1,521 | 1,706 | + 85 | 5 | 8,354 | + 577 |
| Reading Corporation | Oct. 30 | 627 | 683 | + 56 | 30 | 21.565 | + 1,544 |
| Rochdale Corporation | Nov. 1 | 1,470 | 1,610 | + 140 | 31 | 50,721 | + 2.138 |
| Rotherham Corp. | ,, 5 | 998 | 1,226 | + 228 | 31 | 31,589 | + 7,652 |
| Salford Corporation | ,, 3 | 4,920 | 5,240 | + 320 | 31 | 163.169 | + 6.816 |
| Sheffield Corporation | ,, 2 | 6,977 | 7,560 | + 583 | 32 | 232,872 | + 20.105 |
| Southampton Corp. | Oct. 29 | 1,142 | 1,215 | + 73 | 30 | 41,709 | + 2,471 |
| Southend-on-Sea Corp. | ,, 29 | 576 | 725 | + 149 | 31 | 32,420 | + 5,510 |
| South Met. Trys. | ,, 31 | 776 | 1,024 | + 248 | 44 | 40.617 | + 3,304 |
| South Shields Corp. | Nov. 1 | 601 | 660 | + 59 | 31 | 22,760 | + 2.864 |
| Sunderland Corp. | ,, 2 | 1.240 | 1,407 | + 167 | 31 | 45,825 | + 4 932 |
| Sunderland District | Oct. 29 | 513 | 590 | + 77 | 52 | 29.326 | + 5.020 |
| Swindon Corporation | ,, 29 | 157 | 156 | — 1 | 30 | 5,180 | + 349 |
| Trys. (M.E.T.) 'Buses | Nov. 1 | ... | 8,616 | ... | 40 | 206.773 | ... |
| TynesideTrys.&Tmrds | Oct. 29 | 456 | 492 | + 36 | 18 | 9.650 | + 661 |
| Wallasey Corporation | Nov. 1 | 1,029 | 1,125 | + 96 | 31 | 39 222 | + 3,751 |
| Walsall Corporation | ,, 1 | 595 | 643 | + 48 | 44 | 27,378 | + 1,962 |
| Walthamstow U.D.C. | ,, 1 | 623 | 702 | + 79 | 31 | 23,595 | + 432 |
| Warrington Corp | Oct. 30 | 434 | 442 | + 8 | 31 | 13,666 | + 461 |
| West Ham Corporation | ,, 30 | 2,504 | 2 648 | + 144 | 30 | 83,718 | + 2.923 |
| Wigan Corporation | ,, 30 | 1,345 | 1,457 | + 112 | 30½ | 45.536 | + 4,622 |
| Wolverhampton Corp | Nov. 5 | 1.007 | 1.030 | + 53 | 32 | 34,491 | + 1,970 |
| Yorkshire (W. Riding | ,, 2 | 1,344 | 1,458 | + 114 | 44 | 63.829 | + 6,843 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,029 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Nov. 1 | £5,438 | £5,064 | — £374 | 44 | £212.340 | + £6,783 |
| City and South London | ,, 1 | 3,023 | 2,666 | — 357 | 44 | 122 349 | — 11,637 |
| Liverpool Overhead | ,, 2 | 1,598 | 1,725 | + 127 | 44 | 75 508 | + 5,741 |
| London Electric | ,, 1 | 14,130 | 13.690 | — 440 | 44 | 595.285 | + 810 |
| Mersey | ,, 1 | 2 312 | 2 228 | — 84 | 44 | 98,463 | + 4,888 |
| Metropolitan | ,, 2 | 16,593 | 17.966 | + 1 373 | 44 | 755,245 | + 23,597 |
| Metropolitan District | ,, 1 | 13,292 | 13,023 | — 269 | 44 | 568,537 | + 17,602 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, November 7. | |
|---|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gtd. Bds. | ... | 70 — 75 | |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅝ — 4⅞ | |
| 5 | Do. 5½% Cum 2nd Pref. | ... | 4⅛ — 4⅜ | |
| 100 | Do. 4% Deb. Stk. Red. | — 1 | 90½ — 92½ | |
| 100 | Do. 4½% Deb. Stk. Red. | + 1 | 97½ — 99½ | |
| 100 | Do. 5% Deb. Stk. Red. | ... | 98½ — 100½ | |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 100 — 102 | |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — ⅝ | |
| 1 | Do. 5% Cum. Pref | ... | 33/32 — 35/32 | |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 | |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Sk. | ... | 86 — 88 | |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 | |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref. | + 1⅛ | 11 — 12¾ | |
| 100 | Do. do. 4½% Db. Stk. Rd. | ... | 94 — 96 | |
| $100 | Brazilian Traction Light and Power Co. Lim. | — 1 | 85 — 87 | xd |
| 5 | Brisbane Elec. Trams. Investment Co., Ld., Ord. | ... | 7¼ — 7¾ | ,, |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅜ | ,, |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 98 —101 | |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ | |
| 10 | Do. do. 4% Cum. Pref. | ... | 6¾ — 7¼ | |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 | |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 | |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 2 | 118 —122 | |
| 100 | Do. Pref. Ord. Stock | — 2 | 105 —109 | |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | ... | 99 —102 | |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 97 —100 | |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 | |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. | ... | 90 — 93 | |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | ... | 86 — 89 | |
| 100 | Do. 7% Non-Cum. Pref. | ... | 48 — 51 | |
| 100 | Do. 6% Pref. Ord. Non-Cum. | — 1½ | 11 — 13 | |
| 100 | Do. Deferred Ord. Stock | ... | 4 — 6 | |
| 100 | Do. 5% Perpetual Debenture Stock | — 2 | 89 — 92 | |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 75 — 78 | xd |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 | |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | — ½ | 98½ —100½ | |
| 5 | Calcutta Tramways Co., Limited. Ord | — ⅛ | 6 — 6⅝ | |
| 5 | Do do. 5% Cum. Pref. | ... | 5 — 5¼ | |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 | |
| 1 | Cape Electric Tramways, Ld., | ... | 11/16 — 12/16 | |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ | |
| 100 | Do. 5% Debs. Red. | ... | 90 — 93 | |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5⅛ — 5⅜ | |
| 100 | Do. 4% Debenture Stock Red. 1985 | ... | 92 — 97 | |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 88 — 92 | xd |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ½ | 94 — 96 | |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ | |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | + ⅜ | — 10⅞ | |
| 10 | Do. do. 6% Pref. | ... | — 12 | |
| 100 | Do. do. "A" Red. | ... | — 82 | |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 79 | |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 9 — 9½ | |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | 3/32 — 5/32 | |
| 1 | Do. do. 6% Cum Pref. | ... | ¼ — ¾ | |
| 100 | Do. do. 4½% Deb. Stk. Red. | ... | 66 — 71 | |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ | |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 87 — 92 | |
| 10 | Imperial Tramways, Ord. | ... | 3¾ — 4¼ | |
| 10 | Do do. 6% Cum. Pref. | ... | 6¼ — 6¾ | |
| 100 | Do. do. 4½% Deb. Stock | — ½ | 76½ — 77½ | |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2 1/16 — 2 2/16 | |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 | |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — 1/16 | |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 | |
| 100 | Do. do. 6% "B" Do. | ... | 10 — 20 | |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | ⅞ — 1 | |
| 10 | Lanarkshire Tramways Co. | ... | 9¾ — 10¼ | |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. | ... | 77 — 81 | |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1 — 1¼ | |
| 1 | Do. 6% Cum Pref. | ... | 1 1/16 — 1 3/16 | |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 | |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | ¼ — ⅜ | |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 95 — 97 | |
| 100 | Do. Do 5% Cum, Inc. Deb. Stk. Red | — 1 | 85 — 87 | |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 58 — 62 | |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 | |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ | |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 87 — 89 | |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | — 2 | 106 —109 | |
| $1,000 | Do. do. 5% Bds. | ... | 96⅛ — 98½ | |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 32/32 — 1 1/32 | |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 82 — 86 | |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 | |
| $100 | Mexico Tramways Co., Common Stock | — 4 | 74 — 78 | xd |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 4½ | 73 — 78 | |
| 100 | Do. 6% 50-yr. Mort. Bonds | — 6 | 78 — 82 | |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | — 2½ | 90½ — 92½ | |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 97 — 99 | |
| 100 | Do. 4½% Sterling Debs, (1922) | — 2 | 97 — 99 | |
| 1 | National Steam Car Co. Ltd | + 1/16 | 1⅛ — 1⅜ | |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 6 — 6½ | |
| 10 | Do do. 5% Cum. Pref. | ... | 5⅞ — 6⅛ | |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | — 2/16 | 5⅞ — 5⅝ | |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ | |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. | ... | 1⅜ — 1⅜ | |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 1/16 — 1/16 | |
| 1 | Do. 5% Cum Pref | ... | 1/16 — 1/16 | |
| 100 | Do. 4½% Debenture Stock, Red. | ... | 82 — 85 | |
| 1 | Provincial Tramways, Lim., Ord. | ... | 21/32 — 23/32 | |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 | xd |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | — 1 | 82 — 85 | |
| 5 | Rangoon Elec. Trams & Supply Co. 6% Cum. Pref. | ... | 5 — 5½ | |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | + 3 | 97 — 99 | |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 83 — 85 | |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | — | |
| $500 | 1st Mt. 30-yr 5% Gold Bonds | — ½ | 98 —100 | |
| 100 | 5% 50-yr. Mort Gold Bonds | — ½ | 88 — 90 | |
| 100 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | — 2 | 98 —101 | |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | ... | 99 —102 | |
| 10 | Shanghai Elec. Construction Co. | ... | 10½ — 11½ | |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 86 — 90 | |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 5/8 — 3/4 | |
| 100 | Do. do. 4% Deb. Stk. | ... | 68 — 72 | |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 | |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 | |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 86 — 88 | |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 | |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4⅞ — 5⅛ | |
| 5 | Do. do. 6% Cum. Pref. | ... | 5 — 5⅜ | |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ | xd |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 93½ -100½ | |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. | ... | 3/32 — 4/32 | |
| 5 | Do. do. 6% Cum Pref. | ... | 3½ — 4 | |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. | ... | 80 — 85 | |

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

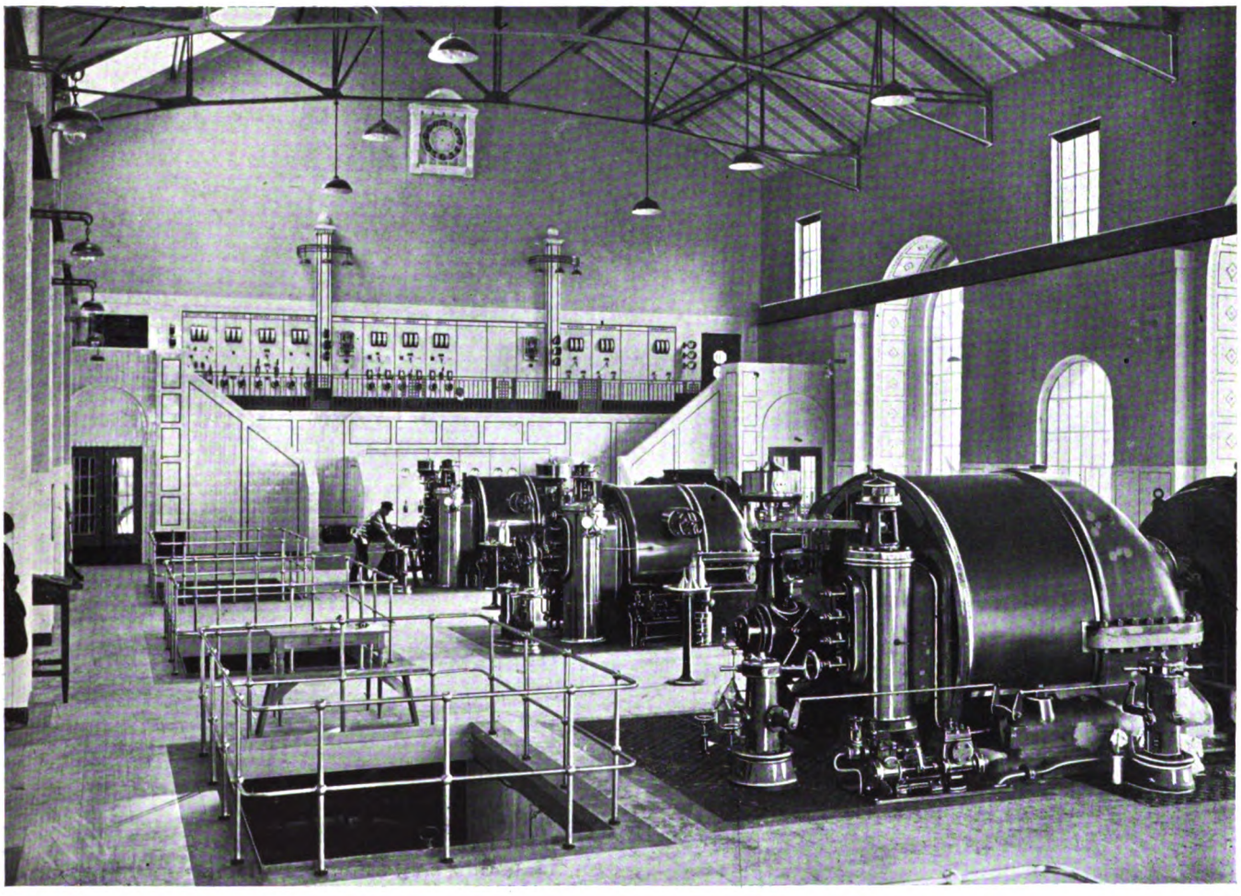
ESTABLISHED 1892. LONDON, NOVEMBER 13, 1913. VOL. XXXIV.

# THE HAMBURG OVERHEAD AND UNDERGROUND RAILWAY.

## GENERAL FEATURES AND CAR REPAIR PRACTICE.

On March 1, 1912, the Hamburg Hoch und Untergrundbahn (Elevated and Underground Railway) placed in operation the first link of a non-surface electric railway of most advanced character. The initial section comprised a route length of 4·03 miles from the heart of the city, Rathausmarkt, to the suburb of Barmbeck, at which point the power-station and car maintenance buildings of the system are located. The line as completed on June 29, 1912, consists of 10·85 miles of double-track in the form of a belt around both Alster Lakes. Of the three branches planned, those to Ohlsdorf and Eimsbüttel, respectively 3·1 miles and 1·6 miles long, will be completed in 1914, while a two-mile line to Rotenburgsort is to follow later.

The physical construction of the new system is of the most massive character, and the viaduct sections, stations, entrance stairways, etc., are unexcelled for beauty of execution. The maximum gradient does not exceed 4·9 per cent. and the curvature a radius of 233 ft. Current is taken by way of a wood-encased contact rail.



Interior of Power-Station - Hamburg Overhead and Underground Railway.

The system was constructed jointly by the Allgemeine and Siemens and Halske Companies, which formed a special organisation, termed a "Bauverwaltung," for that purpose. The State of Hamburg receives defined shares of the gross receipts from the several classes of tickets, and becomes owner of all right-of-way and stationary equipment after 40 years.

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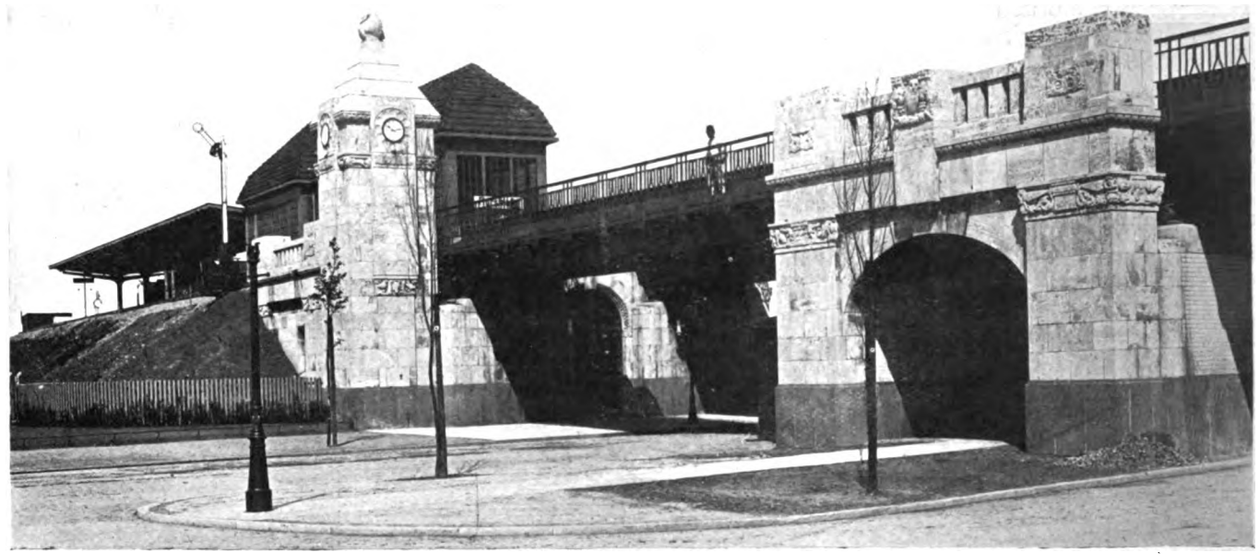
That the new service is very popular appears from the fact that the average daily travel now exceeds 100,000 passengers, and on Easter Monday, March 24 last, about 200,000 passengers were carried in only 76 cars, the remaining four being in the shops. In fact, the increase in traffic has already necessitated an order for 50 more cars, while the present generating equipment of one 4,000-KW. and two 2,000-KW., 6,000-volt, 50-cycle, three-phase turbines is to be reinforced by a fourth machine of 6,000-KW. output.

The popularity of the new service may be ascribed in large measure to the high train speeds. Every car, which weighs 24 metric tons empty, and about 30 tons loaded, is equipped with two 100-H.P. 800-volt continuous-current commutating pole motors, and as motor cars only are employed, the very high rate of acceleration of 1·5 miles per hour per second is readily attained. The maximum possible speed of the two-car and four-car trains in service is 37·2 miles an hour, the permissible speed 31 miles an hour, and the schedule speed, with 23 stations spaced about 2,500 ft. apart, 17·68 miles an hour. The station stops are very short, namely, 15 to 18 seconds.

Hauptbahnhof Tunnel Station.

the ring. Second and third-class fares obtain, but as the former class has 25 per cent. of the seating capacity, and only 12 to 15 per cent. of the business, this division is not considered a financial success. The minimum fares, good for five stations, are 1·25d. (10 pf.) third-class, and 1·875d. (15 pf.) second-class. Workmen's two-way tickets at one-way prices, and season tickets are also sold.



Flurstrasse Overhead Station—Forming Ornamental Gateway to Public Park.

It should be added that only one-half the trains negotiate the complete belt, the arrangement being such that a 2½-minute service is given over the busy section, and a 5-minute service over the outer part of the ring.

Curve Approaching Rodingsmarkt Station.

### The Car Sheds and Shops.

The car sheds and shops of the company at Barmbeck are good examples of the best Continental practice. As they are intended to harbour and maintain in good condition high-voltage equipment, which is subjected to hard service throughout a long working day, no effort was spared to attain this end. The present installation comprises a car shed just enlarged from four to six four-track bays, each track serving four cars, a repair building containing every facility from the smithy to the paint shop, and an intermediate transfer table 33 ft. wide, whereby cars are shifted from the sheds to the shops and *vice versa*.

Two conspicuous and commendable features of both buildings are their fire-proof construction and the great proportion of natural lighting area. The walls are of steel and 15 in. red brick, with steel truss and concrete block roof with continuous type longitudinal skylights, except that the crane-run in the truck overhauling shop called for a transverse skylight, and that small individual

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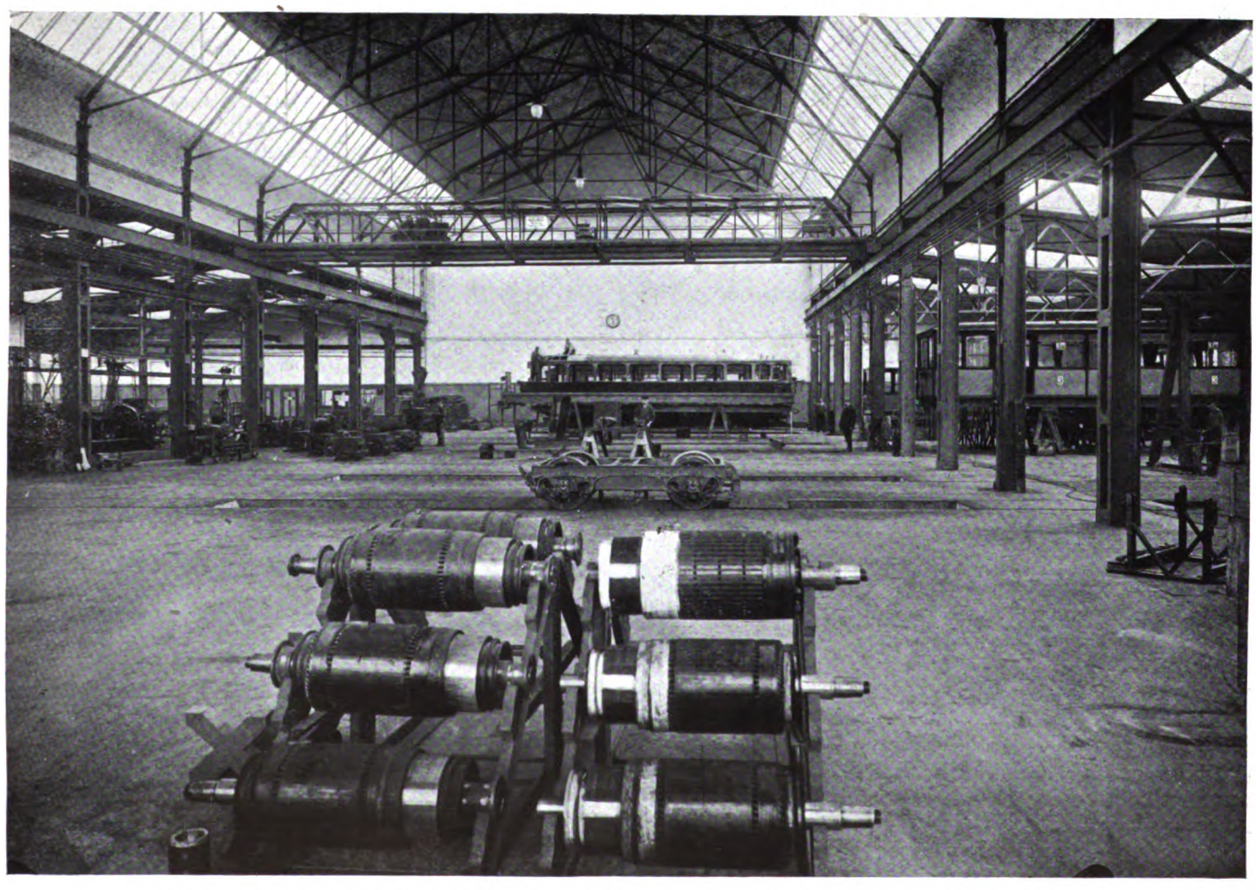
Interior of Well-Lighted Car Shed with Open Pit Arrangement.



Interior of Truck Repair Shop—Machine Section on Right and Car Body Section on Left.
HAMBURG CAR DEPOT AND REPAIR SHOPS.

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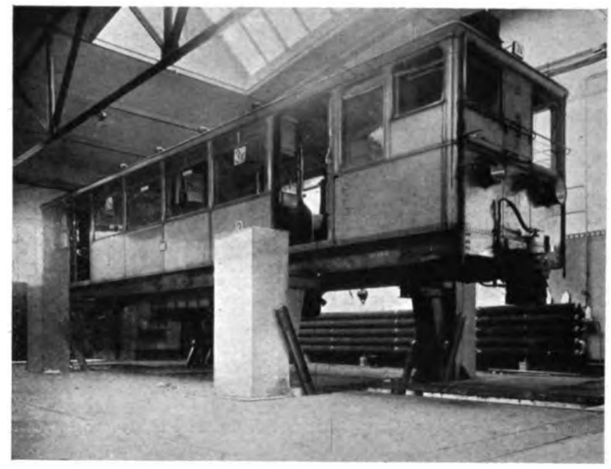
skylights are used for the more isolated shops. The desire for a maximum amount of daylight has been carried so far that the outside wall of partitioned sections, like the carpentry shop, is glazed almost from the floor level to the ceiling. Glass is also used in the upper panels of the swing-type track doors. A decorative feature common to both buildings, and one eminently characteristic of the Germanic spirit for neatness, is the application of painted and stencilled borders to form a wainscoting about 7 ft. high along the walls. Another instance of the desire for spotless appearance is the use of fully-inclosed cleansing rooms to avoid spattering grease and dirt on the exposed walls and floor. Even the fire hose is kept in dust-proof glass-framed cases. That the discipline of the German army extends into the private workshop is shown by the fact that a group of employees have been trained to fight fires, and that a system of alarm signals has been drawn up in connection therewith.

As the car sheds primarily are not storage but operating structures their tracks have been provided throughout with pits of open type 4 ft. 11 in. deep. These pits are heated by radiators supplied with exhaust steam from the adjoining power-station. Sockets for incandescent lamps are installed in the pits at frequent intervals, but the lamps themselves are attached only when light is actually needed for the work in hand. The aisles between the tracks are paved with hard-burned brick and are of liberal width, 8 ft. 6 in., so that ladders for window cleaning and other purposes may be placed against the cars without obstructing passage. Instead of taking car-flushing water from the fire lines, separate standpipes with twin outlets are used. These outlets are situated between the pits, and when not in service they are concealed by hinged covers.



Electrically-Worked Car Hoist—Hamburg Shops.

As a third-rail installation was impracticable for moving the cars in the shed, it was necessary to devise a simple form of connection between the collector shoes of the cars and a light overhead conductor, which is suspended from the roof trusses over the centre line of each aisle. This connector consists of a wooden pole with cable runway, the lower end of the pole carrying a brass lug which fits a recess in the car shoe whilst the upper end has a V-shaped groove to fit the conductor. The tension of the car shoe has been found sufficient to insure good contact for current collection.

Like the car shed facilities, the repair shops were laid out for expansion, but it is not likely that anything will be done in that direction for some time owing to the splendid behaviour of the car equipment. The electrical shop, for example, has not yet been obliged to handle a burn-out of any kind, although the motors are operated at 800 volts, continuous current.

The general plan of the repair shop, which measures 260 ft. 8 in. width by 201 ft. 2 in. depth, is that of a great central area 135 ft. 9 in. by 56 ft. 7 in. for the heavy car body repairs, truck overhauling, and the heavier machine tools, but partitioned rooms are constructed at the sides and rear as store room, smithy, paint shop (with two independent track entrances *via* the transfer table), woodworking shop, electrical shop, workmen's dining room and toilet, etc. About one-half of the length of the eight tracks in the centre area is devoted to car body repairs, and the other half, which is nearer the machine tools, to truck overhauling.

All car floor repairs are handled on one track, which is equipped for that purpose with a screw-type hoist. This hoist is driven by a 7½-H.P. motor, and can raise a 20-ton body at the rate of 0·18 in. per second. The 7½-ton crane which spans the truck overhauling shop has a runway which enables it to transport heavy parts to every section where large masses of metal are employed. A second crane, but of 5 tons capacity, and comprising a hand-hoist and electrically-operated bridge, serves the machine shop alone. Material from the store room is conveyed to the 7½-ton crane of the overhauling shop by means of a hand-operated telpher.

The machinery installed in these shops is of the widest range, so that the management can undertake practically every class of car and equipment reconstruction.

In addition, there are several contrivances and practices to be noted which are more or less original to this installation.

Particular interest attaches to the method of cleaning trucks. These are stripped of their electrical fittings and journal boxes, after which they are carried by the 7½-ton crane to the open top of a special chamber, which is usually isolated from the rest of the shop by a cement-covered steel door of sliding type. Here the stripped trucks are plunged as long as need be into a vat containing a caustic soda solution of boiling water. A smaller vat serves for the similar treatment of motor shells and smaller metal parts.

A second chamber of similar construction, supplied with a compressed air line and exhaust, is in use for blowing out motors, individual armatures, and the like, so that dust and filings cannot find their way into the open shop.

As the Hamburg undertaking proposes to make its own electrical renewal parts, it has installed a Passburg equipment for the vacuum impregnation of coils.

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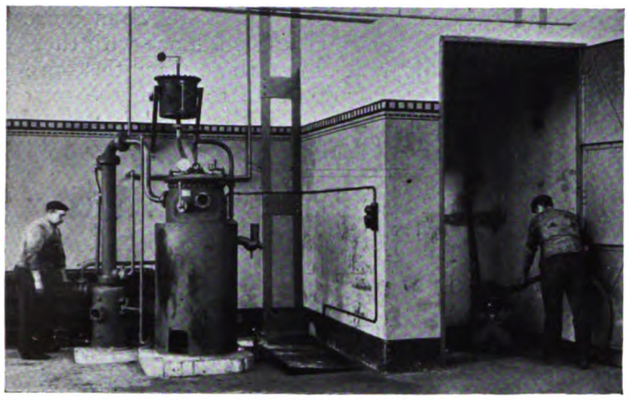
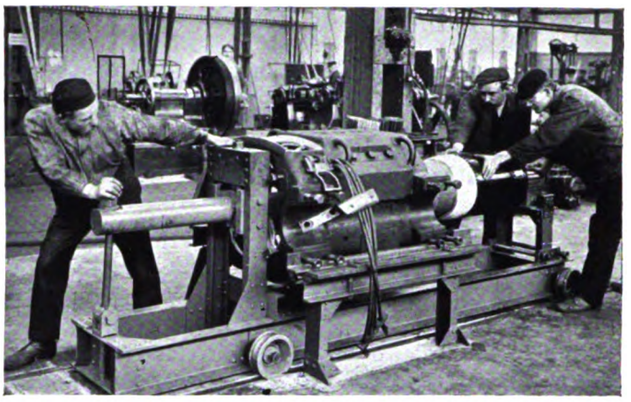
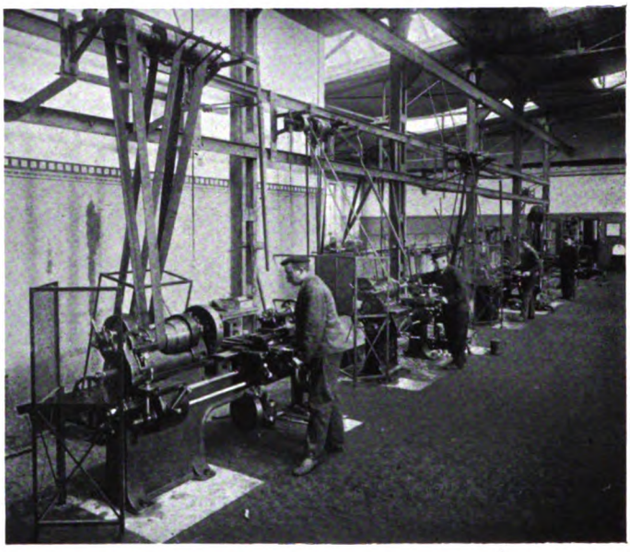


Vacuum Impregnation Apparatus.
(On the right, chamber for blowing out Armatures.)

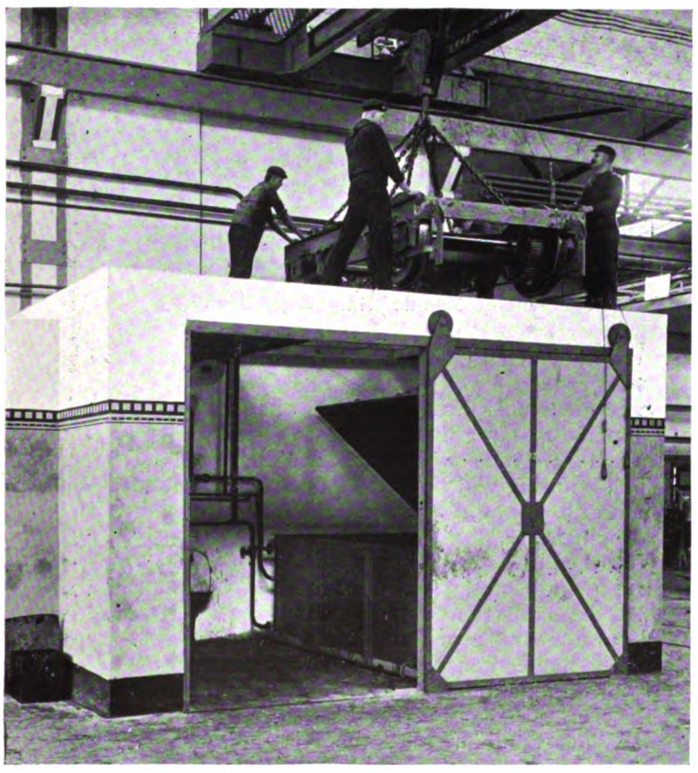


Ram for Removing Armatures.

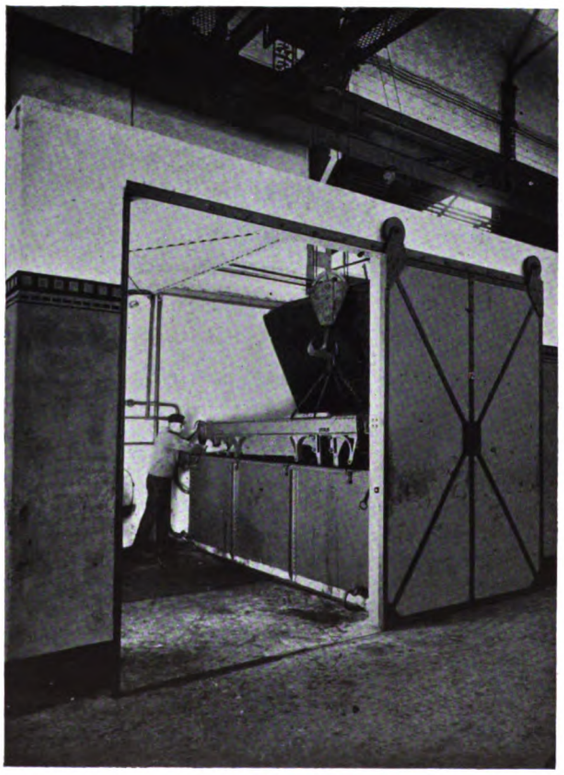
Carpenters' Shop with Glazed Side and Ventilators.



Machine Shop.



Truck Slung from Travelling Crane being Lowered into Vat.



Truck Lowered into Vat.

Dipping Vat for Cleaning Trucks, etc.

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An unusual feature is that the impregnation tank has been set below the floor level.

Owing to their size, the traction motors are necessarily of solid frame construction, as split frames for this capacity could not be handled in a pit. For the removal of defective armatures, the shop forces have devised a combination of a fixed motor stand and a carriage which carries a ram to fit into the end of the motor shaft. After the motor has been placed on the stand by the crane, its end pieces and bearings are removed, and then the ram carriage is pushed by hand along its track until the armature has been forced out of the frame. It may then be readily inspected, since it is supported at its outer end by a stand which is fixed to the carriage. When an armature is to be replaced in the motor, it is necessary only to roll the carriage back to its original position. It is evident that this procedure could be hastened by using a pneumatically-operated ram, but man-power is deemed sufficient in view of the small amount of armature work likely for some time.

With the exception of the gas ring equipment for expanding tyres and for soldering, all work is done by electricity either directly or indirectly. Thus the compressor which supplies air for blowing out motors and for other shop work also supplies power for the operation of a hammer in the blacksmith shop. All motors are operated on three-phase current. The gas outfit just mentioned is similar to that of the London electric railways. It is not likely to see much service for some time, as up to February 15, 1913, the first steel-tyred wheels had run more than 100,080 km. (62,000 miles) without showing any need for early replacement.

In conclusion, a few words concerning the conveniences for the shop workers will not be out of place. Ample space has been provided with separate steel lockers for clothing, toilet room with high-grade sanitary plumbing and tiled floor, shower baths, dining room, and a completely equipped kitchen, where the men are welcome to prepare their food in accordance with their desires. It is apparent that these facilities are appreciated, and that they do much to make the men take greater pride in maintaining the *esprit de corps* of these shops.

**Overhead Roads at Barmbeck Station, Showing Arrangement of Signals—Hamburg Railway.**

## LONDON AND SOUTH WESTERN RAILWAY ELECTRIFICATION.

BEGINNING OF THE WORK ON THE SUBURBAN LINES.

Work on the line, in connection with the London and South Western Railway Company's scheme of electrification of their suburban lines, which was briefly outlined in our issue of December 12, 1912, was commenced at the end of October at Teddington. Work on the power-station, which will be situated at Wimbledon, immediately to the east of Durnsford Road sidings and adjacent to the main line, is well advanced. The outer wall is completed up to ground level, and the foundations for the chimney stacks are finished. The foundations will be sufficiently far advanced for the erection of the steel structure to be commenced at the end of this year. The building will consist of two main bays forming a boiler house and turbine house, with a switch house attached, and will be 260 ft. long by 210 ft. wide. There will be two chimney stacks at the west end, each 236 ft. high, and 13 ft. 6 in. internal diameter. A line will be constructed and carried on a viaduct from a point near Durnsford Road bridge, up into the roof of the boiler house, from which coal may be dumped from wagons direct into bunkers over the central firing floor.

When completed the boiler house will contain 24 boilers, each capable of a normal evaporation of 20,000 lb. of water per hour, and supplying steam at a

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pressure of 200 lb. per square inch, and with a superheat of 200 deg. Fahr. Coal from the overhead bunkers will descend through shoots into mechanical stokers driven by electric motors. Economisers will be fixed in the main flues for heating the boiler feed water.

The turbine room, when completed, will contain six steam turbines coupled to 5,000-KW. three-phase alternators, which will run at 1,500 revolutions per minute, and will generate current at 11,000 volts. There will also be two auxiliary steam turbines coupled through gearing to 400-KW. direct-current dynamos for supplying power for the power house lights and auxiliary motors. The switch house will have three floors, and will contain all the switch gear for controlling the main generating plant and the outgoing feeders. The main oil switches will be controlled from a desk erected on a balcony on the first floor overlooking the turbine house, and will be electrically operated.

Below the turbine house there will be a basement which will contain surface condensers, with the necessary air and circulating pumps, together with 10 hot wells and boiler feed pumps. A 40-ton overhead electric travelling crane will span the turbine room.

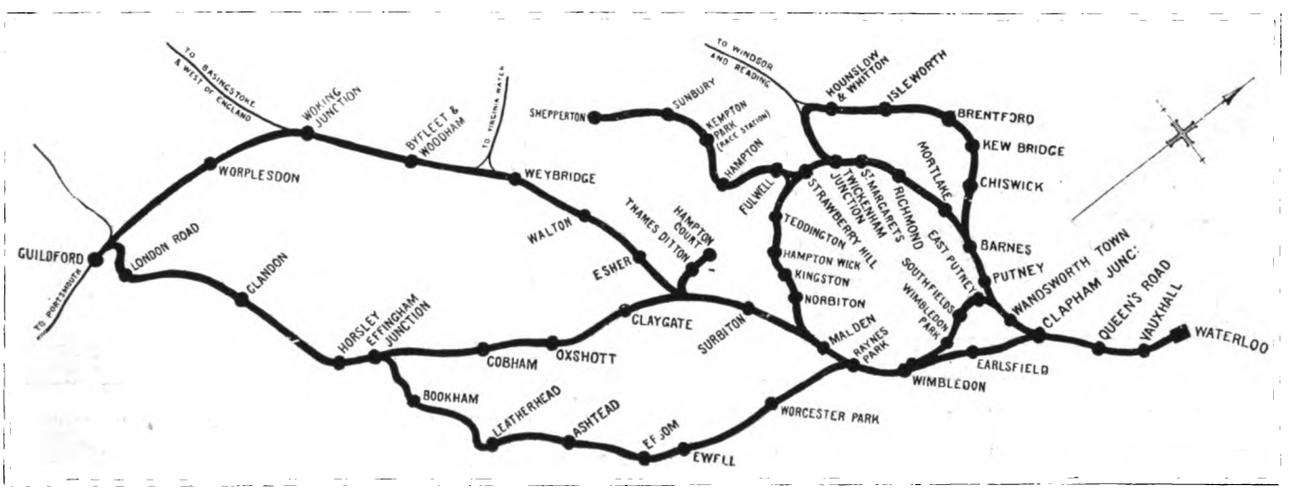
The current generated at 11,000 volts at the power house will be transmitted to nine sub-stations by three-core cables. These cables will be paper insulated, lead sheathed, and wire armoured. They will in most cases be supported on posts beside the line, and will be so arranged as to afford a duplicate supply to all sub-stations. These latter will be erected at Waterloo, Clapham Junction, Raynes Park, Hampton Court Junction, Barnes, Twickenham, Kingston, Sunbury, and Isleworth. The buildings, with the exception of that at Clapham Junction, will be 50 ft. wide and from 65 ft. to 103 ft. long, and will consist of a machine bay and a switch gear bay. At Clapham Junction the sub-station will be located on No. 5 platform under the gangway leading to St. John's Hill, and this site will require a special arrangement of buildings and apparatus.

Each sub-station will contain static transformers and rotary converters, together with the necessary switch gear, for transforming the three-phase high-tension current to direct current at 600 volts, in which form it will be used by the trains. Two sizes of converters will be used, the larger, having a continuous capacity of 1,875 KW., at Waterloo (4), Clapham Junction (3), Raynes Park (2), Barnes (2), and Twickenham (3), and the smaller, having a continuous capacity of 1,250 KW., at Hampton Court Junction (2), Kingston (2), Sunbury (2), and Isleworth (2).

From the sub-stations, direct current at 600 volts will be delivered to a conductor rail which will be laid along the line 16 inches from gauge and at such a height that the contact surface will be three inches above rail level. The rail, of which considerable quantities have been delivered, is of special steel, having a resistance of about 6¾ times that of copper of the same length and cross sectional area, and weighs 100 lb. per lineal yard. It will be supported by insulators fixed on the sleepers, and will be bonded across the joints by four flexible copper bonds expanded into holes drilled in the rails before delivery. Current will be collected from the rail by the trains by means of cast-steel collector shoes hung from the trucks, and the return side of the circuit will be formed by the running rails, which will be bonded across the joints by two flexible copper bonds.

For the first section of the electrified lines, 84 train units are being provided. Each unit will consist of three compartment type coaches and will be equipped with four motors, each of 275 H.P., together with the necessary control apparatus. These motors will be the largest ever mounted on a passenger coach.

A special motor truck, carrying two motors, will be fixed under each end of the train unit, the remaining trucks being of the company's standard pattern. The control apparatus will be of the relay automatic multiple-unit type providing for uniform acceleration, and controlling from the front driving cab all the motors on a train of any length. Every train unit will have a driving cab, containing control apparatus for two motors, at each end, two luggage vans, and seating accommodation for 190 passengers.




**London and South Western Railway Electrification.**

It is the intention to commence electric working on the Kingston roundabout line first, and it is hoped that this line will be in operation before the end of next year. Electric services on the Hampton Court and Shepperton branches and on the Hounslow loop line will be added as soon afterwards as possible.

The work on the permanent way is being carried out under the direction of Mr. J. W. Jacomb Hood, the company's chief resident engineer, and the electrical work is in charge of Mr. Herbert Jones, the company's electrical engineer. The new rolling stock is being constructed at the Eastleigh works under the direction of Mr. S. Warner, carriage and wagon superintendent. Electrical equipment for the 84 train units is being supplied by the British Westinghouse Electric and Manufacturing Company. The entire scheme is under the supervision of the general manager of the London and South Western Railway, Mr. H. A. Walker.

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# THE CORROSION OF TRAMWAY RAILS.

By Robt. B. Holt, A.M.I.Mech.E.
*(Permanent Way Engineer, Leeds City Tramways).*

The writer has drawn attention, from time to time, in this journal, to various causes resulting in rail wear. These may be recapitulated as follow: The speed and weight of the cars, the density of the car service, the design of the rails and the quality of the rail steel, and the nature and weight of the ordinary street traffic. In addition to these more important causes, the rate of wear is undoubtedly influenced to a considerable extent by the frequent use of the brakes and brake sand, the proportion and extent of the gradients, the condition of the wheel tyres, the cleanliness of the rails, and, to a varying extent, by the corrosion of the rail steel. The regular gauging of rails, in all positions, indicates that the rate of wear increases rapidly with the speed of the cars, and that speed is far more destructive to the rails than traffic density; unfortunately it is not possible to express the ratio of the wear in terms of either the speed of the cars or the traffic density on account of the variations caused by the presence or absence of any of the above-mentioned supplementary factors. By observing tracks where the conditions, excepting speed, are almost identical, the writer has noted in several instances that the number of cars carried on tracks where the speed has not exceeded 10 miles per hour has been double that on tracks over which the cars run at 15 miles per hour and upwards. It is also a notable fact that the wear of rails is more regular where the ordinary street traffic is of a light order. Again, as the writer has shown in previous articles (and as illustrated in Fig. 1), there are numerous instances on the larger tramway systems where the rails have become worn out without ever having been run over by the tramway cars; such wear being almost entirely due to the ordinary street traffic.

To turn to the question of rail corrosion, this would appear to be more likely to take effect in damp situations, where the rails are alternately wet and dry, and subjected to an infrequent service of cars. It has been suggested, and with very good reason, too, that the impurities deposited from the atmosphere in many of the great industrial centres may have a deleterious effect on the rails, and in conjunction with this suggestion, the nature of the road mud should receive due consideration, particularly where there is considerable cartage of trade wastes, which drain from the carts on to the track surface.

On railways the rails deteriorate more rapidly in tunnels than in the open air, on account of the presence of sulphurous gases from the locomotives, and to the moisture which is generally percolating through the walls, the corrosion taking effect over the entire rail-section. In a paper on the "Wear of Steel Rails in Tunnels," presented to the Institution of Civil Engineers in April, 1900, Mr. Thos. Andrews states that in one tunnel 3,000 ft. long the average loss in weight of rails from corrosion and wear was 2·8 lb. per yard, as compared with an average annual rate of ·324 lb. per yard for rails under the same volume of traffic in the open air.

In a discussion on a paper by Mr. G. Lawford, "The Maintenance of Permanent Way Exposed to the Sea," read before the Permanent Way Institution in 1909, it was stated by Messrs. G. Lawford and Fletcher that there is rapid deterioration of rails, fish plates, and bolts, due to corrosion, when exposed to moisture-laden sea-winds. On one particular length of line referred to, the life of the rails is five years less than on other parts of the same line which are not so exposed. According to Mr. Fletcher, similar lengths of rails on the North Eastern Railway are so corroded that the web of the rail is reduced in places to ⅛ in. in thickness, and the whole of the surface of the rails exposed to the north-easterly winds, is pitted to an alarming extent (see Fig. 2). It is stated that "this pitting can only be detected with difficulty, except when the rails are wet," and also that the deterioration is almost entirely on the rail which first catches the sea moisture-laden winds. The pit marks are said to be "in clusters, and to be for a long time covered up with a cake of rust, which, when it falls away, reveals a black carbonised blotch on the rail which quickly becomes coated again."

In a paper contributed to the Journal of the Tramways and Light Railways Association by Mr. W. Thom, general manager of the Potteries Tramways, the author draws attention to the fact that the wear of the rails is not directly proportionate to the number of cars which have passed over the rails, and he suggests that the bulk of the extra wear is due to corrosion, and that the difference in the speed of the cars may be ignored. From measurements which Mr. Thom has taken, he infers that the wear due to the passage of

Fig. 1.—Wear of Tramway Rail Entirely Due to Ordinary Street Traffic.

Fig. 3.—Runnels of Liquid Between Coal Stack and Rail.

Fig. 4.—Corrosion of Rail Tread when Liquid Flows into Groove.

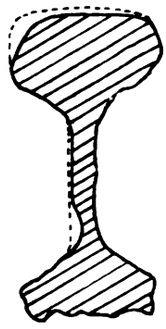

Fig. 2.—Corrosion of Rail Exposed to Sea Water.

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10,600,000 car tons is ·2279 in. and the loss of metal due to corrosion during the same period is ·0846 in. To Mr. Thom is due the credit for being the first to attempt to express the rate of corrosion in proportion to the number of years the rails have been in service, but it is improbable that the loss of metal can be satisfactorily accounted for in this manner. As the present writer has indicated, the speed of the cars, the quality of the rail steel, the nature and amount of the ordinary street traffic, etc., are all factors of primary importance, and their effect on the wear of rails is too far-reaching to be ignored. The writer has

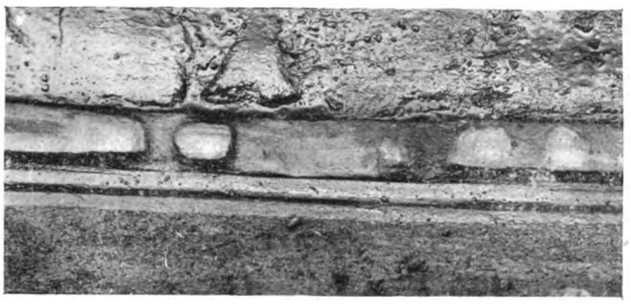

**Fig. 5.—Corrosion of Rail Tread when Liquid Flows into Groove.**

ascertained from collieries and steelworks that the rails in sidings near to deposits of coal and coke, and those carrying wagons dripping with moisture from these materials, corrode much more rapidly than other rails in the same sidings that are not so exposed. The writer has been observing for a considerable period the effect on the rails of the sipe water from a large stack of coal in the tramway permanent way depôt, Leeds. This coal has been stacked to an average height of about 11 ft.; rain water is absorbed and is afterwards discharged in the form of small runnels of a light brown coloured liquid, which drain into the tramway rails surrounding the stack.

There are two varieties of steel in the track which has received this discharge for a period of 18 months, viz., ordinary basic Bessemer steel and Sandberg basic Bessemer steel. The former variety has corroded away rapidly at each place where the liquid has flowed over the rail tread, as shown in Figs. 3, 4, 5, and 6. The depth of the corrosion varies: in a number of places it exceeds $\frac{1}{4}$ in., with variations in width up to several inches, as may be seen in the photographs. The liquid has attacked the Sandberg steel also, but to a far less extent, the maximum depth of the corrosion not exceeding $\frac{1}{64}$ in., and at the same time there are no indications of irregular pitting. The loss of metal is uniform, as shown in Fig. 6.

The analysis of the liquid is as follows:

| | |
|---|---|
| Water .. .. .. .. .. | 96·41 per cent. |
| Ferric sulphate .. .. .. .. | 2·27 „ „ |
| Ferrous sulphate .. .. .. .. | 0·85 „ „ |
| Calcium sulphate, etc. .. .. .. | 0·47 „ „ |
| | 100·00 per cent. |

NOTE.—The analysis shows this to be a dilute solution of the sulphates of iron, probably formed by the oxidation of the iron pyrites in the coal.

(Signed) THOS. FAIRLEY, *Analyst.*

This case is an exceptional one, of course, but it clearly indicates the susceptibility of ordinary rail steel to corrosive influences, and as there are many indications of corrosion and pitting to be observed on tramway rails, it is evident that the question of rail corrosion will have to receive more attention in the future.

## BRILL 39-E BOGIE TRUCK.

The views on the following page show the J. G. Brill Company's latest 39-E patented bogie truck, of the swing-bolster centre-bearing maximum-traction type. Many original features have been introduced into the design of this bogie, and the clean lines, as well as the sturdy construction, will be noted. This 39-E swing-bolster maximum-traction truck is at present in use on the Preston Corporation Tramways, and the Gateshead and District Tramways also have cars mounted on similar bogies. The second illustration shows the Gateshead car mounted on the Brill 39-E trucks. These cars were built at the Gateshead depot for the special purpose of dealing with heavy additional traffic. The length of car over buffers is 43 ft. 3 in., and has a seating capacity for 46 passengers. The cars are of the pay-as-you-enter type.

The 39-E trucks are designed to be placed with the pony wheels toward the end of the car, although in some cases they have been arranged for the reverse position.

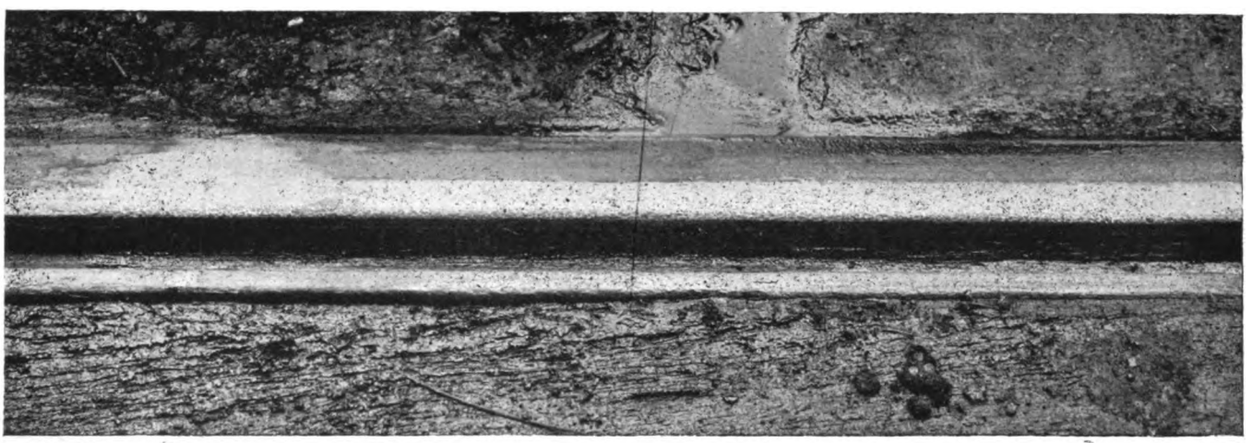

**Fig. 6.—Effect of Corrosive Liquid on a Sandberg Steel Rail.**
(The corrosion is uniform and mild.)

With the pony wheels toward the end of the car the bolster centres can be placed farther apart without interfering with the platform supports, or increasing the height of the car. Also a centre-pull lever may be used for the brake system, which enables an equal division of pressure to be maintained on the shoes of both sides of the truck on curves as well as on tangents. Another advantage of having the pony wheels toward the end of the car is that by placing the V-plate of the compression device on the end crossing of the truck frame, the weight on the pony wheels is not only



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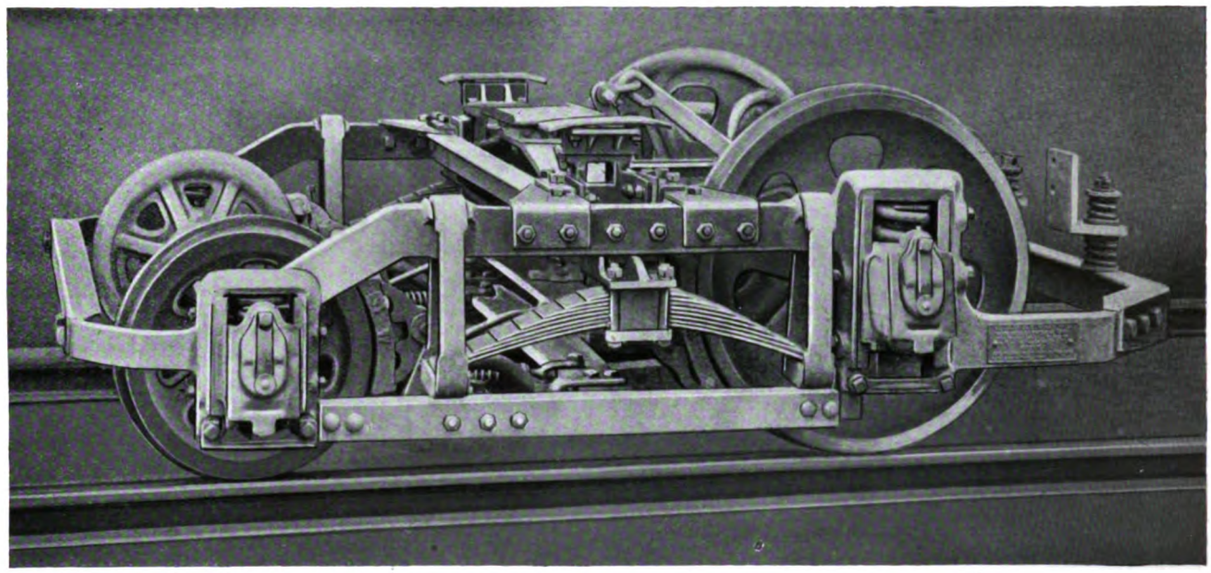
increased on curves, but the wheel on the outer rail receives more weight than the wheel on the inside.

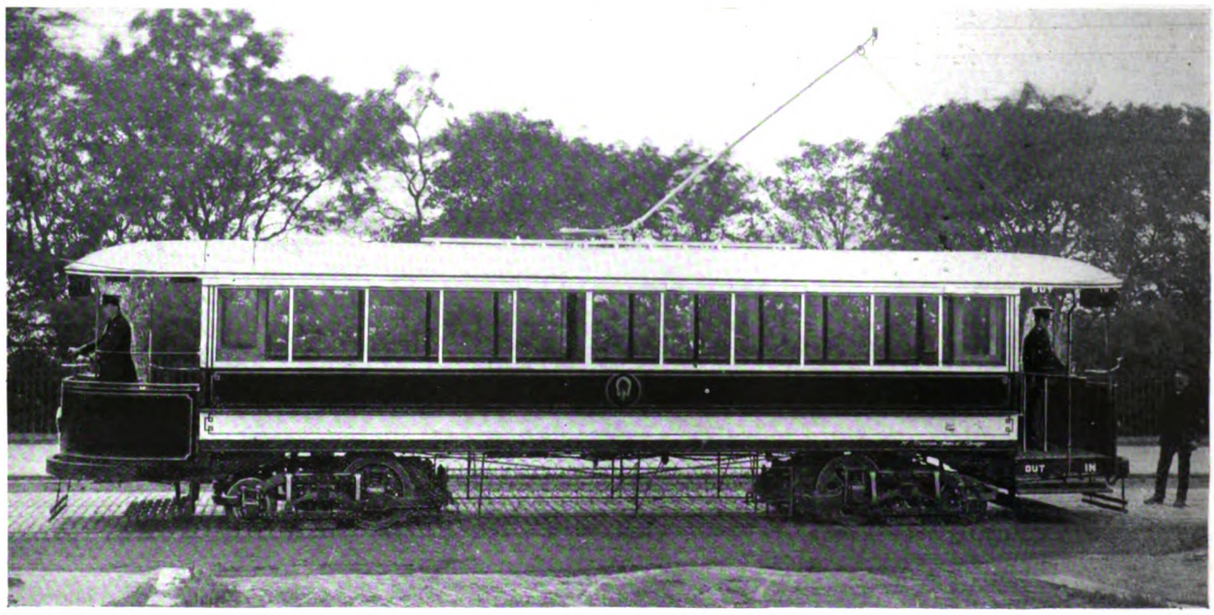
The bolster in these trucks is supported on semi-elliptic springs placed longitudinally, the ends of which rest in links suspended from the side frames. The links cushion the side swing of the bolster on curves, to the benefit of both car body and trucks.

As usually built, these trucks have a 4 ft. 6 in. wheel base, 20 and 21 in. pony wheels, and from 30 to 33 in. drivers. With 30 in. wheels, the platform step treads may be $14\frac{3}{8}$ in. from the rail, from treads to platforms 12 in., from platforms to car floor $8\frac{1}{4}$ in. The central or pivotal point of the truck being within a few inches of the centre of the driving axle, the swing of the large wheels is reduced to a very small amount, even on sharp curves. It also reduces the swing of the motor, so that large motors may be used without interfering with the car sills, enabling the car body to be brought low. There is, of course, an increased radiation on the pony wheels, but as they are of small diameter, they swing clear of the sills.

The eccentric disposition of the load, or the placing of it near the driving wheels, is one of the chief features of the single-motor truck. The load is carefully distributed upon the drivers, giving ample tractive force for grade climbing and rapid acceleration. Only so much weight is left upon the pony wheels as is necessary for guidance on tangents. By means of a V-plate, a spring post near the axle of the pony wheels is depressed when the truck takes a curve, thereby increasing the load on these wheels for the time, precluding any possibility of derailment. When the truck is placed with the pony wheels turned towards the centre of the car, the V-plate is attached to the car body and the spring post is mounted on the truck; this is reversed when the pony wheels are towards the platform. The apparatus is adjustable to suit conditions by simply turning a nut bearing against the compression spring. Usually it does not require attention, since a suitable distribution of the weights is made and the device adjusted before the trucks leave the works.



Brill 39-E Truck.




"Pay-As-You-Enter" Car of Gateshead and District Tramways Company on Brill 39-E Trucks.

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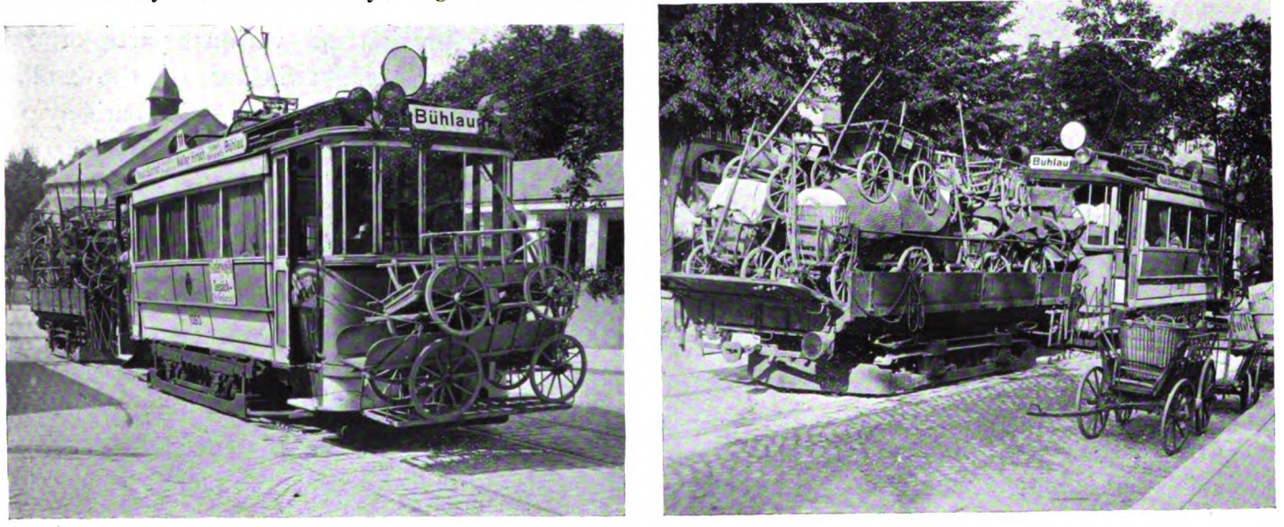
## GOODS TRAFFIC ON DRESDEN TRAMWAYS.

The exceptional tramway service which the Municipality of Dresden has created to meet the peculiar requirements of the inhabitants of a locality situated at some distance from the town, is of special interest at the present time. The problem which confronts so many urban authorities is that whilst there is crying need for the extension of routes into extra-urban districts, the population is nevertheless too sparse to permit of such service being remunerative. The example of Dresden in supplementing passenger returns by special goods traffic has an important bearing on this point.

Most of the laundry work of Dresden is done outside the town. In the region through which the Waldschlösschen-Weissig line passes quite a population, women mostly of course, are engaged in this occupation. The road into Dresden is extremely uneven, some of the gradients being very steep, and the transport of the washing from and into the town has always been a great hardship to the women, and in many cases rendered the task impossible. The washing was conveyed in the low carts of primitive form common everywhere in Germany; dogs are harnessed to these, and once arrived in Dresden the task of delivery is comparatively easy. The only element of difficulty in the situation is the intervening road, and the utilisation of the tramway service was the only means by which this could be overcome.




Transport of Hand Carts by Tramway—Dresden Municipal Tramway.

To provide for this service, special trailers have been constructed for conveying the carts. They are provided with special flaps, which greatly facilitate loading and unloading. These carts are taken on the wagon only at Waldschlösschen, but discharged at any point desired on the journey. The arrangements are so convenient, and the construction of the goods trailers so well adapted for the purpose, that any of the washing carts can be put off in less than one minute, and no interruption of the ordinary six-minute service is caused.

The persons who deliver the washing, together with the dogs and a certain number of baskets, are carried in the motor car. There is no disorder whatever; women and dogs get off the cars at any point, and their cart with its load is placed on the road for them at once. There is one limitation, however, to which, when the traffic is heavy, no exception can be made. The carts are unloaded from the trailer exactly in the reverse order to that in which they have been taken on. Consequently, the washing folk have to range their carts according to their separate destinations; if they fail in this, they may be taken further than they wish to go, but naturally, in their own interest, they do not often fall into an error of this kind. They are, of course, assisted by the goods conductor, who will, as a rule, make any slight rearrangement necessary in the course of loading up.

The municipality, while responsible for the safe delivery of goods to a reasonable extent, as specified in the by-laws, will not compensate for damage to goods due to bad packing, or any other non-compliance with the regulations, and, similarly, the owner of goods will be liable to pay for the repairing of any damage which they may do. Anyone conveying explosives or anything else which is dangerous or a public nuisance may, in addition, be heavily fined.

It will be readily understood that where arrangements are so elastic as to cope with such difficult transport as this, the ordinary goods transport will also be considerable. For this also, that is to say the transport of parcels on the ordinary cars, admirable arrangements have been made. The driver's platform is reserved for passengers with packets, who must remain with these, as the management accepts no responsibility in this case. The charges are very small: they are based on the amount of floor surface taken up by the packages, and are equal to the fare or fares of the person or persons who could otherwise occupy this space. It will be seen that by piling goods on each other, they will be most advantageously transported, as their cost will in this way be exceedingly small for the owner. It only remains to add that the service has not only been of great value to a striving and needy class, but also a source of much profit to the municipality.

**An Opening for Electrification.**—At the quarterly meeting of the Wicklow County Council, the county surveyor reported having carried out the annual inspection of the Dublin and Blessington Steam Tramway. In giving the financial results for the past year he said the increased receipts obtained by giving a better service, when there was an opening for such, were altogether eaten up by the fuel bill, and when the cost at 3s. 9d. per tram-mile of the electrically-worked Lucan tramway was compared with 19s. 6d. per mile of the Blessington line, it was easy to understand why the counties had to contribute. There was nothing for it but to try to have some change made on the line, and it would be in the Council's favour if the line were worked by electricity. Mr. Walsh asked: Would the County Council, as the largest guarantors, enforce the sale of the line to any company willing to take it up? The Surveyor: I cannot tell you. It is wrapped up in the law. Mr. McCarroll said the matter was in the hands of a committee who were doing their best in the interests of the Council. The report was referred to this committee.

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THE
# Tramway AND Railway World

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**The Noise of Tramways.**

During the 1912 Conference of the Municipal Tramways Association, Professor Carus-Wilson roused a certain amount of resentment by describing the tramcar as one of the noisest of public vehicles, and by suggesting that tramway engineers ought to give serious attention to the problem of reducing the volume of sound. The resentment of the members was only half serious, because they seemed to doubt whether the speaker himself was quite serious in drawing a comparison between the tramcar and the motor omnibus in favour of the latter as regards quietness of running. It is worth noting, however, that a similar comparison was made only a week or two ago in the *Times*. The petrol vehicle was formally claimed to be the most silent on the road, because it runs on rubber tyres, and is now provided with gears which operate without appreciable noise. While the tramcar was not condemned as the noisest vehicle—that distinction being given to the horsed van with its iron tyres and its chains and other loose gear—the wheel-on-rail system was definitely fixed as essentially more objectionable than the tyre-on-road system. Almost the only protest against this judgment was that made by a correspondent who referred to the multitudinous hootings of motor cars and to the nerve-racking jar which the changing of gear still produces. But we need not go into the question of relative noisiness in order to appreciate the contention that a tramway service often produces more noise than is pleasant to the residents, shopkeepers, and the public generally. If anything could be done to modify the noise materially, it would be a real gain to the popularity of tramways. We may put aside, for the moment, the factor of rail corrugation, since it is an exceptional trouble which every tramway manager is only too anxious to remove. Under more normal conditions the noise caused by a tramcar is due partly to the rolling (or skidding) of the wheels on the rails, and partly to the rotation of the motors and gears, the grinding of the wheels at curves, the knocking of the wheels at joints and crossings, the vibration of various parts of the equipment, and the swishing of the trolley on the wire. Most of these noises are aggravated by the tendency of the car body to act as a sounding board. No two systems are quite alike in the degree to which the various parts of the equipment contribute to the noise of running, but there must be few systems which are not susceptible to improvement in regard to nearly all the sources of sound vibration. The noise of the gears may not be capable of great reduction, but as it is a sustained note of low pitch it does not have the most serious effect on the nerves. Intermittent noises, such as the knocking at joints and the shrieking at curves (together with the general rattle which seems to accompany the movements of some cars at high speeds) are much more objectionable as well as more readily cured by attention to the condition of the track and the upkeep and design of the trucks. There are some systems which literally cry aloud for reconstruction. One can measure the debility of a tramway system by the noise it makes; and the same token shows that energy is being expended unnecessarily. Banging and grinding and rattling are sure signs of wasted power, and their existence to an abnormal extent on any tramway should force the management to reorganise the equipment. In any case there are plenty of reasons why tramway engineers should give close attention to a problem of whose existence they have perhaps not been fully aware. Hitherto there has been no persistent

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and deliberate effort to secure the quietest possible running. If those responsible for the design of cars and the construction and upkeep of tracks united in this effort, there would be less likelihood of the free-running vehicle claiming popular favour on the ground of silent operation.

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**Prepayment and Accident Prevention.**

A significant admission was made to an interviewer by the manager of the Bradford Tramways a few days after his return from the Municipal Tramways Conference. At Bradford the partial prepayment method, *i.e.*, the collection of the fares of top-deck passengers on the platform, came into operation on June 1, and Mr. Spencer stated that since that date the average number of passengers who have received injuries while alighting from cars has been 33 per month, as against 56 per month in 10 months prior to that time. Mr. Spencer added that the cases of passengers being without tickets or over-riding the stages have also very considerably decreased, and he cannot understand why a man should be content to wait his turn in a queue at a railway booking office and object in the case of a tramcar. Clearly in a few months' time we ought to be able to announce that Bradford has agreed to give a trial to cars properly fitted for prepayment. Now that the London County Council have put into force their powers to compel passengers to form queues, and now that the majority of ordinary passengers buy the cheap return tickets introduced through omnibus competition, the time is favourable for Mr. Fell to impart to the Highways Committee some of the interest which he takes in the pay-as-you-enter system. Hitherto the chief obstacle to a trial of it in London has been the Commissioner of Police, but Sir E. Henry may be interested to learn that the Chief Constable of Aberdeen considers the system an advance on the old one. Mr. Fell's objection, put forward in the course of the discussion on the subject at the Municipal Tramways Conference, that with the prepayment system London would have to return to the reversed staircases, which the police ordered to be altered a few years ago, loses its point when it is recalled that their order was made on account of the staircase obstructing the side view of the motorman. On the more commodious platform provided with the pay-as-you-enter designs, the staircase is not advanced to the point of obstruction. Moreover, the reversed staircase obviates all danger of a passenger falling through the railing on to the road. As to the remark that in London passengers might sustain injury in wandering about the upper deck in order to descend at the motorman's end, the same objection is applicable to the present system. Unless passengers leave their seats while a car is in motion they are now carried beyond the place where they desire to alight. Perhaps the greatest fear that animates tramway committees in regard to the prepayment plan is that it would not be workable in towns where the fares are varied and complicated. To these inquiries the Leicester chairman made the reply that his conductors carry twenty kinds of tickets, and that the ticket system there is a complicated one.

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**State-Operated Tramways.**

Much can be said in favour of carrying on the work of local transportation by municipal enterprise, but it would be difficult to find sufficient grounds for tramways being owned and worked by the State. A municipality is amenable to local feeling, and knows, or ought to know, local needs, so that even the out-and-out advocate of private enterprise can see that there are some arguments in favour of municipal tramways. But what can be said in support of the principle of "the dead hand of the State" being laid on transportation systems which do not affect the country as a whole, but only certain parts of it, each part with it own local requirements? Many sound reasons can be brought forward against the nationalisation of railways, but still there are some in favour of the scheme where all the railways of a country can be worked as one big system. No such reasons exist in favour of State tramways. Even railway nationalisation has its troubles; one need go no further than the recently issued report of the South African Railways showing decreasing net revenue, rising expenditure, enormous wages to employees backed by requests for more, and inability to set aside enough money for depreciation and renewals. These and other reflections are suggested by the last report of the New South Wales Government Tramways. These lines are confined for the most part to

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Sydney and its immediate environs, but no doubt the Government will start tramways as required in other parts of the State. In past years these tramways have paid their way after allowing for working expenses and interest on capital, though there appears to be no sinking fund. For the year ended June 30, 1912, there was a surplus, after meeting working expenses and interest, of £57,000. But for the year ended June last there was a loss of £32,000. While the revenue for the twelve months rose by £173,000, the expenses increased by no less than £240,000. The passengers increased by over 27½ millions and the mileage run by fully 2½ millions. The deficit is attributed to the same cause which produces difficulties wherever the State works railways—namely, the necessity for giving in to demands for higher wages from employees who are also electors. It seems that the tramway staff numbering 9,170 men (for a system measuring 208 miles) have received concessions and advances equal to £282,230 per annum. Part of this money may of course be wages paid to additional men required owing to shortening the hours of work. In any case the total increase in money is equal, on an average, to nearly 12s per week per man of these 9,170 men. This it is to have State tramways and the Labour party all powerful. Even apart from the financial disorganisation of the tramway undertaking, what is to happen to private enterprise and the individual employer if they have to pay wages commensurate with those paid by the State? Undoubtedly a very difficult problem is arising and indeed has arisen in many of the British dominions. Apparently we are to see State tramway experiments, more or less direct, in West Australia and New Zealand. Unless sane counsels prevail, the end of such systems of management can only be bankruptcy.

## THE LATE BARON ZIFFER.

We record with deep regret the death, at the age of 81, of Herr Ingenieur Emanuel A. Ziffer, Edler von Teschenbruck, a title with many others he had earned through his extraordinary services as president for many years of the Austrian Union of Tramways and Light Railways and of many of the companies affiliated to it. He was a prolific writer on technical subjects, and was well known to all participants in the Tramway Congresses organised by the Permanent International Tramways Union for many years past. He was one of the original members of the Union and had served on its Council for many years, and the earnest and enthusiastic way in which he worked in the development and advancement of all light railway and tramway matters was remarkable. His untiring energy never flagged until his last illness, and only recently he was actively pursuing his professional work. He suffered but a short time, and died on October 27 last at his residence in Vienna. He was buried two days later in the central cemetery in the presence of many of his friends and admirers.

## A MUNICIPAL TRAMWAY IN SAN FRANCISCO.

Although the question of municipally-owned tramways has from time to time been agitated in the United States little or nothing has been done in that direction, so that a municipal tramway in that country is a departure that will be watched with keen interest. We give below some particulars regarding the inception of one such line, called the Geary Street Municipal Railway, San Francisco, based upon an article in the *Electric Railway Journal*, of New York. Readers acquainted with the history of tramways may recall that Geary Street, San Francisco, is a name prominenly associated with the commercial beginnings of cable tramways many years ago.

It appears that for a long time the municipal ownership of what are called public utilities has had strong advocates in San Francisco. The proposal to have a municipal tramway first came up in 1896 in connection with an effort of the Geary Street, Park, and Ocean Railway to secure a 50-year extension to its franchise in Geary Street, which was to expire in 1903. The company were refused a renewal, and the same thing happened again in 1898. In that year the city adopted a new charter, in which the intention of the city to acquire, own, and operate public utilities was expressly declared. In 1902 and 1903 unsuccessful attempts were made by the advocates of municipal ownership to get authority from the voters of the city for a bond issue to secure funds for the reconstruction for electric traction of the cable tramway. When the franchise of the company expired in 1903, the company continued to work the line and paid 5 per cent. of their gross earnings for the permission. In 1905 the Board of Supervisors declared their intention of rebuilding the road without recourse to a bond issue. All was ready for the construction work when the earthquake and fire of 1906 devasted the business section of San Francisco. All records, plans, and estimates were destroyed.

Some 18 months later the project was revived, but an appropriation of money from the city budget for the purpose was declared illegal. Another proposal in 1909 to issue bonds failed to get the necessary two-thirds vote of the electors, but in the end of that year proposals of the same kind were at length carried. A legal action to restrain the selling of the bonds failed, and about $2,000,000 worth have been issued. They bear interest at 4½ per cent., and mature yearly from 1915 to 1934.

Construction work began in the summer of 1911, and at present 7·6 miles of double track are in operation. Forty-three cars have been purchased, and a reinforced concrete car shed has been built. In August last an additional bond issue of $3,500,000 was voted for the construction of new lines and the reconstruction of existing ones. When the Geary Street line was taken over no allowance was made for old rails, etc., but the company were allowed to remove any property they desired.

The cost of construction and equipment (power is purchased from a company) was $1,680,255. The receipts for the period from December 28, 1912, to June 30 last were $134,924, and the expenses were $73,252, leaving a surplus of $61,672. After paying interest, but with no allowance for taxes, depreciation, or sinking fund, there remained $32,557. Moreover, the interest was not charged on the total cost, but on the cost of such parts of the road and equipment as were in use at a given time. The finances of the undertaking have been subjected to some criticism, but the mayor thinks it is a veritable gold mine. Time will show.

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## CARS OF THE COLOMBO TRAMWAYS.

The accompanying photographs illustrate a convertible car of a type which is being adopted as a standard by the Colombo Electric Tramways and Lighting Company, Limited. The motors and equipments have been supplied by Messrs. Dick, Kerr, and Company,

Car with End and Side Entrances.

the motors being of the manufacturers' latest type, fitted with interpoles and oil ring lubrication. The car illustrated is mounted on an M. and G. "Warner" radial truck, with an 8 ft. wheel base. The body was built in the company's workshops at Colombo, and has a seating capacity for 38 passengers, including four seats for first-class passengers, for whom a

With Side Entrance Blinds Lowered.

separate compartment is provided. As will be seen from the illustrations, there are three centre openings on either side of the car and end exits, which permit of exceptionally rapid loading and unloading. The provision of a central aisle and cross benches enables inspectors and conductors conveniently to perform their duties.

**West Bromwich and Railless Traction.**—At the October meeting of the Town Council a memorial was received asking the Corporation to avail themselves of the powers conferred by the Corporation Act in respect of the provision of vehicular conveyances to and from the Old Church district. The Highway Committee reported that they were considering the question. The borough surveyor, Mr. A. D. Greatorex, has visited Leeds, Bradford, and other places where trackless trolley systems are in operation, and will present a formal report on the subject.

## THE AMERICAN ELECTRIC RAILWAY CONVENTION.

The annual convention of the American Electric Railway Association and of its allied bodies, which was held in Atlantic City from October 13 to 17, appears to have been very successful. The attendance of delegates was large, and the papers and reports presented were so numerous that the time for discussion was not always adequate.

At the opening meeting of the Electric Railway Association it was reported that it has now 401 member companies and 2,997 individual members, and that 450 individuals engaged in committee work during the past year. There is not a single city of any size in the United States which is not represented in the membership of the Association. This is a highly satisfactory state of things, especially in view of the increasing difficulties which in America are besetting the industry.

In the multitude of speeches, papers, and reports which were submitted to the various associations, perhaps the most interesting from a general point of view was the opening address to the Electric Railway Association by President Harries. In this he foresaw that unless there be well-nigh miraculous intervention, electric railway companies are in for a succession of more or less destructive experiences. These will result on the one hand from the broadening of city borders, and the consequent extension of lines, forcible multiplication of transfer points, compulsory wage increases, conscienceless taxation, arbitrary and unreasonable service requirements, and growing cost of construction and maintenance, and on the other hand, from the fixed or rather the diminishing fare. Every element of cost has advanced by leaps and bounds, while the fare has steadily decreased. Mr. Harries favoured a graded fare according to distance, something after the British method. The Association has a department called the bureau of fare research, from the work of which much is hoped. In dealing with other matters, the president insisted on the importance of publicity work being carried out through the executives of the various companies, and of the industry being in the future even more than in the past officially represented at Washington, so that the Association can keep in touch with the many legislative, executive, and judicial projects that concern common carriers. Before proceeding to refer to the valuable work during the year of the committees of the Association, the president made one reference which will strike a responsive chord in this country. He said that in some cities the public motor 'bus already presents a serious proposition which, if not considered promptly, may develop into a problem the country over. The unfairness of competition between the cheaply licensed and mobile vehicle and the expensively franchised and restricted railway has awakened comment. Remedial measures should be framed by an Association committee. These words of the president are equally applicable in this country.

A matter of some interest on this side was the fact revealed by several reports submitted, that progress is being made with the work of establishing standards in design and in construction work. Several additional standards were adopted during the Convention. There are three divisions in the proposals made by the Standards Committee of the Electric Railway Engineering Association, namely, standards, recommended practices, and miscellaneous approved methods and practices. A standard style of overhead construction has been adopted.

Another point on which British practice is being followed is a standard classification of accounts. The Accountants' Association are still working on this, and

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the Inter-State Commerce Commission are to give their aid in the final settlement.

Among other subjects on which reports or papers were presented were working rules, signalling, the prevention of accidents, structures and buildings, power generation and distribution, welfare of employees, profit-sharing, electrolysis (evidently still a troublesome matter in America), and the development of the self-propelled car for lines where the traffic is light.

At least one representative of tramways from this side of the water attended the gathering, namely, Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, who was then in America making a study of electric railway practice there. The American must have his joke, so Mr. Dalrymple is represented as having said to an "unofficial interviewer" that the famous Atlantic City ocean was fully equal, so far as its spectacular features were concerned, to that which bathed the shores of Great Britain!

Among those who attended the manufacturers' exhibition, which is always a feature of the Convention, was Mr. G. H. Anger, managing director of the Anger Manufacturing Company, of Preston, who in conjunction with the Ackley Companies showed his automatic brake adjuster, with which our readers are familiar. Mr. Anger was present during the Convention.

## CORRESPONDENCE.

### Municipal Tramway Conference.

To the Editor of the Tramway and Railway World.

Sir,—The Municipal Tramways Conference has come and gone, and the only thing that remains is the very excellent report of the proceedings furnished by the technical press.

To the ordinary delegate there did not appear to be any new line of thought introduced, either in the presidential address or the papers read, and the discussions seemed to be of the usual character, being carried on principally by chairmen and deputy-chairmen, certainly not of the larger undertakings. The only other persons who appeared to have any opportunity of taking part in the discussions were a few members of the Executive Council, who usually have something nice to say about their particular undertakings; one, especially, who seems to think that his own system is the centre of tramway creation. Under the circumstances, it is not to be wondered at that, generally speaking, tramway managers outside of the Executive Council assume a passive attitude at these conferences, and this is likely to continue until a change is made in the methods of electing the Executive Council. It would probably be efficacious if a rule was introduced under which it would be obligatory for members of the Council to retire at the expiration of three years' service, and not be eligible for re-election for a fixed period. Past-presidents could remain on the Council as *ex-officio* members. By the introduction of such a rule each member of the Association would have an opportunity of serving on the Council, thus creating a new and all-round interest in the work of the organisation. It is to be hoped that the Council will consider this suggestion.

Coming back to the proceedings at the Conference, one finds nothing new in the president's address; but although President Fearnley touched no absolutely new ground, yet we could quite appreciate his prudent remarks, which will, no doubt, be helpful to the younger and less experienced managers.

With regard to Mr. Alderman Flint's paper on the pay-as-you-enter system, surely this title is a misnomer, as it could hardly be described as a paper in the accepted sense of the term. Would it not be more correct to call it a description of the methods adopted by the Leicester Corporation in the management of its traffic department?—methods which I venture to think will not be followed by any tramway authorities who run their undertakings on strictly business lines. Mr. Alderman Flint was good enough to give us a history of the ancient and modern systems of fare collecting on his undertaking, and furnish us with a list of the most complicated ticket system I have ever met with during a very extensive experience, including overlapping, discount, transfer, return, and return transfer tickets, etc., etc. The paper is embellished with copies of these tickets, and, in addition, the photograph of a gentleman who is the recipient of a free pass, and whose name appears on the pass, which entitles him to "ride free on all sections." This pass is actually signed by the chairman of the committee, apparently "none genuine without!" A copy of another free pass is shown, and the name of the recipient given. This pass is also signed by the chairman, but unfortunately, no photograph is given. Surely there is a little incongruity about this matter, and persons of a humorous tendency might even describe it as Gilbertian. Of course, it must be admitted, that the gentleman who received a free pass without his photograph upon it has a real grievance, and we most sincerely hope that the chairman will forthwith remedy this undoubted grievance by having the photograph added and initialled by himself.

Regarding Alderman Flint's advocacy of the pay-as-you-enter system, I do not think that experienced tramway managers will treat his remarks on this question seriously, as it is perfectly obvious to those of us who have sufficient experience in the collection of fares that it would be quite impossible to collect all fares on the platforms of cars on any of the large systems before passengers entered the car during the crush hours without delaying the traffic and causing an intolerable nuisance to the passengers, apart from other practical difficulties.

It is, of course, the desire of every tramway manager to have the fares collected as soon as possible after passengers board the car, and the great majority can be collected on the platforms during normal traffic without delay.

Yours, etc.,

*October 21, 1913.* A Member.

## PROGRESS OF THE PREPAYMENT CAR.

The Gateshead and District Tramways Company have recently placed a new pay-as-you-enter car on the Low Fell route. The car is illustrated on page 414.

Aberdeen Tramways Committee have considered a report prepared by Mr. Pilcher, the general manager of the Corporation Tramways, on the working of the P-A-Y-E cars in the city during the present year, with a view to adopting the system for six new cars which are shortly to be purchased. The committee decided to take no action until after they have inspected a wider staircase, which is being constructed at the department's workshops.

Ten new top-covered cars ordered by the Leicester Tramways Committee are to be constructed so as to be capable of being used as P-A-Y-E cars in the event of the Corporation deciding to add to the number of such cars now in use.

### Leicester Employees Praise the System.

At a well-attended meeting of the Leicester branch of the Amalgamated Association of Tramway and Vehicle Workers, the advantages of the P-A-Y-E system over that of the old type of car were discussed, and the following resolution was adopted: "That we deeply regret the attitude taken by the Town Council, and a small section of the public, with regard to the proposal of Alderman Flint to extend the P-A-Y-E system in Leicester. Those of us who have the experience of working both systems, claim that we should know something of the advantages of the P-A-Y-E over the old cars, and we are unanimous in our approval of the P-A-Y-E system. We are also unanimously of the opinion, that, viewed from every standpoint, the system is far superior to the old one."

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## TRAMWAYS AND RAILLESS TRACTION AT ABERDARE.

FIRST INSTALLATION OF THE COMBINED SYSTEMS.

The system of tramways and railless trolley routes belonging to Aberdare Urban District Council, the formal inauguration of which for public service took place on October 9, following the Board of Trade inspection, forms the first systematically combined scheme of the sort conceived, constructed, and opened as one undertaking. Messrs. Stephen Sellon and Partners were the consulting engineers for the undertaking, which was authorised by Act of Parliament in 1911, and the route lengths comprise $2\frac{3}{4}$ miles of tramways and $3\frac{1}{2}$ miles of trackless trolley line. The tramway track is laid with girder rails of Sandberg specification, weighing 96 lb. to the yard. The line includes some gradients, the maximum reaching 1 in 13. The tramways are constructed as a single line with passing places, and the overhead equipment is mainly on the span-wire method. The four railless routes, which diverge from the tramway at four different points, are equipped on the Cedes-Stoll system with bracket arm construction. The overhead work was erected by Messrs. Clough, Smith, and Company. Single-deck tramcars, each with seating accommodation for 28 passengers, are used, while the railless cars each seat 27 passengers. The depot is situated at Gladlys, in close proximity to the Council's generating station, wherein additional plant has been installed for the purpose of meeting the traction load. The power-station has two additional units, the engines having been supplied by Belliss and Morcom and the dynamos by the Lancashire Dynamo Company. The total capacity available for traction is 400 KW.

The Glamorganshire valley, in which the undertaking is situated, is a hive of industry, coal mines and iron and other works being dotted along it. The centre of the locality is Aberdare itself, with a population of over 50,000, but industries straggle out to the south-east and north-west. Additional means of communication of a local kind was, therefore, felt desirable, and this led to the combined scheme of the District Council, which has now reached fruition.

The combination of tramway and trackless trolley is

———Tramways. – – – – – –Railless Lines.

**Tramways and Railless Lines at Aberdare.**

thoroughly well suited to the locality. There is one through tramway route, single track with passing places, from Aberaman in the south-east, through Aberdare, to beyond Trecynon in the north-west. This trunk tramway line is fed by and acts as a distributor to four trackless trolley routes on the Cedes-Stoll system which run through outlying districts. From the southern end of the tramway one of these routes extends nearly a mile further south-east to

"Cedes" Railless Trolley Installation at Aberdare.



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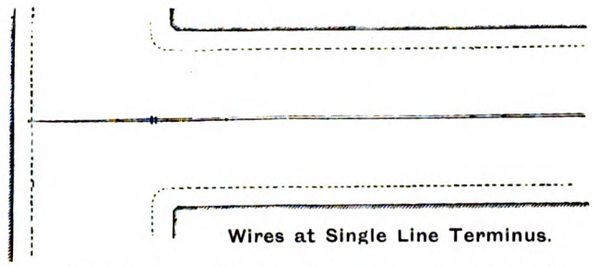
a village called Capeoch. From the same point a second railless route reaches south-westwards up a side valley for a mile and a quarter to the village of Cwmaman. In the centre of Aberdare the tramway sends off another railless spur north-eastwards for nearly a mile to Abernant, while finally the tramway



Wires at Single Line Terminus.

is continued from its north-western terminus by a trackless route for half a mile to Cwmdare. The self-contained combined system was constructed at small cost, and is calculated to serve the population in a way which no other could do.

The railless routes entail severe services, as the maximum gradient is 1 in 9. The cars, which weigh 5 tons loaded, and provide seating capacity for 27 passengers, mount this gradient easily at a speed of

Railless Car Passing Under Railway Bridge.

Running with Trolley "Close-Hauled."

8½ miles an hour. On the level the maximum speed of the cars, fully loaded, is 16 miles an hour. The chassis of the cars and the equipment is identical with that of the cars at Keighley, which were described and illustrated in our issue of October 16. The design of the car body is, however, somewhat different, as will be seen from the accompanying views. The equipment at the termini is of the simplest character. As indicated in the accompanying sketch, the wire comes to a dead end, no reversing of the trolley being necessary.

The installation is under the charge of Mr. A. J. Abraham as general manager and electrical engineer, the traffic manager being Mr. Henry King. The chairman of the Tramways Committee is Mr. E. M. Hann, and the vice-chairman Mr. T. W. Williams.

The inauguration was highly successful, and the District Council, Messrs. Stephen Sellon and Partners, and the Cedes Electric Traction Company, as well as the local public, are alike to be congratulated on the completion of a really useful and efficient undertaking.

Members of the Council, together with representatives of Messrs. Stephen Sellon and Partners and of the Cedes Electric Traction Company, attended the opening run made by the cars. Later in the day the Council and officials were entertained at dinner by the consulting engineers. The proceedings were presided over by Mr. T. W. Williams, chairman of the Council, supported by Mr. T. Ingliss Rudman, resident engineer, Mr. Beverley Griffin and Mr. T. Williams, representing Messrs. W. Griffiths and Company, and Mr. J. Parkinson, representing Messrs. Clough, Smith, and Company. Mr. Beverley Griffin, in proposing prosperity to the town and trade of Aberdare, said that the events of the day showed that Aberdare was a progressive town, and he hoped that it would progress a little further, so that the scheme might be extended to Mountain Ash, four miles away. The Chairman, in reply, said he was of opinion that they depended too exclusively on the coal trade, but by providing electric power they would encourage other trades and manufactures, and would enable small men to compete with larger ones. Councillor L. N. Williams, in submitting "Success to the Aberdare Tramways," said he expected that before long the tramway profits would reduce the rates of the district. Councillor A. P. Jones, who responded, referred to difficulties which had been experienced in inaugurating what was for them a great public convenience. From appearances that day he was assured of a great success for the undertaking. Councillor W. Thomas submitted the health of the contractors, and said that all appreciated the great work which had been carried out. The Council were perfectly satisfied with what had been done. Mr. Stephen Sellon, who proposed "Our Guests," said that Aber-

"Cedes" Railless Car at Aberdare.

dare, apparently dead, had been wakened up to practical existence by electric tramways. He was especially pleased to see Aberdare placed above other districts, which would proceed to copy Aberdare.

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## EXTENSION OF NEW YORK RAILWAY SYSTEM.

The New York Public Service Commission have issued a well-illustrated book giving a comprehensive account of the great developments which are being made of the underground and elevated electric railways in and around New York City. The new project is known as the dual system of rapid transit, and the following is a summary showing the single track mileage of existing lines and of those to be constructed. (The underground railways are described as subways.)

| For Operation by the Interborough Rapid Transit Company. | Track Miles. |
|---|---|
| Existing subway | 73·00 |
| Existing elevated lines | 118·00 |
| Subway and elevated lines for construction jointly by city and company | 146·80 |
| Elevated railroad extensions to be constructed by company | 10·40 |
| Third tracks on elevated roads to be constructed by company | 10·50 |
| Total | 358·70 |

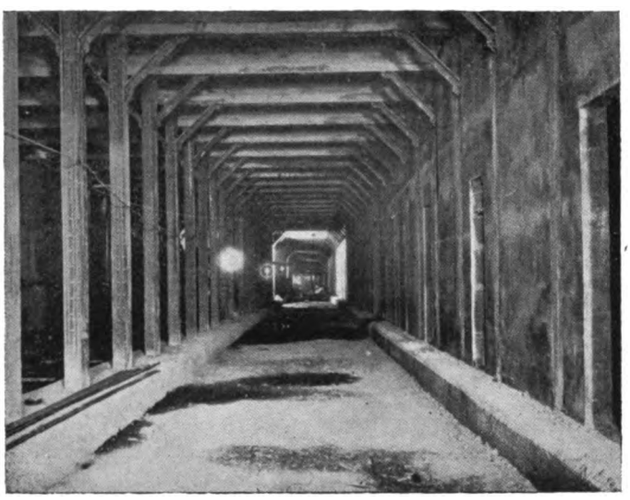
| For Operation by the New York Municipal Railway Corporation. | Track Miles. |
|---|---|
| Existing elevated lines | 105·00 |
| Subway and elevated lines for construction jointly by city and company | 110·41 |
| Elevated extensions for construction by company | 35·29 |
| Third-tracking and reconstruction by company | 9·30 |
| Total | 260·00 |
| Grand total | 618·70 |

The extended undertaking, it is claimed, will make the greatest city railway system in the world. The existing lines measure 296 miles of single track, and this, as shown by the above summary, will be raised to over 618 miles. The new lines will be combined with the existing ones, and will be worked in two divisions, one by the Interborough Rapid Transit Company, which operates the existing subway and the elevated railroad in Manhattan and the Bronx, and the other by the New York Municipal Railway Corporation, formed for the purpose by the Brooklyn Rapid Transit Company, which controls the existing elevated railroads in Brooklyn. The construction and equipment of the new system will cost about 337 million dollars (£67,400,000), and it will be borne jointly by the city and the two transit corporations.

On March 19 last, the City of New York, by the Public Service Commission, entered into separate contracts with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation for the construction, equipment and operation of the dual system. While the existing mileage will be about doubled, the present facilities will be more than trebled, as the third-track and extensions of existing elevated railways will materially enlarge their capacity. At present the rapid transit lines are carrying about 800 million passengers per annum. The dual system, if used to its full capacity, will be able to carry more than 3,000 millions in the same period of time.

Out of the total cost the City of New York will supply about 171 million dollars, all of which will be devoted to construction work on lines to be owned by the city. Towards the cost of such lines the Interborough Company will contribute 58 million dollars and the Municipal Railway Corporation about 14 million dollars. The cost of additional construction on the elevated railroads, as well as that of the new equipment for both subway and elevated lines, will be borne by the companies, although the equipment of the city-owned lines will be the property of the city. The total contributions of the companies will be about 105 million dollars for the Interborough Company and 61 million dollars for the Municipal Railway Corporation. In addition to the above the city has already invested 55 million dollars for the construction of the existing subway, and the Interborough Company has expended 48 million dollars in equipment for the same lines. The total city investment will accordingly be 226 million dollars.

Owing to the situation of New York and the peculiar conformation of its five boroughs, its rapid transit requirements are exceedingly difficult to satisfy. Travel on city transportation lines is all towards the southern half of Manhattan Island in the morning and all away from it in the evening. The book proceeds to give details as to the existing railways and to the specific extensions which are proposed. One important change is that the Brooklyn Company will be allowed to enter



Subway In Progress Under Roadway.

Manhattan Island, where it will have a system of subways by which it can distribute its passengers throughout the southern part of the island. Thus the present congestion at the Manhattan terminus of the Brooklyn and Williamsburg bridges will be ended, and the passengers from Brooklyn will be able to reach their destinations in Lower Manhattan without change of cars or the payment of additional fares.

The contracts provide for a single fare of 5 cents on each system, with free transfers at intersecting points for a continuous ride in the same general direction. It will be possible for passengers to travel 26 miles for one fare and without change of cars. The contracts contemplate that the whole system will be in operation in the year 1917, but it is expected that parts

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of the system will be put into operation from time to time as each part is completed, so that long before the time set for complete operation the community will realise in part the benefits of the new lines. Parts of the new system are already nearly completed, including the Steinway tunnel under the East River to Long Island City. The addition of a third track to the existing elevated railroads will enable the companies to inaugurate through express services on all lines where it is now possible to give only local services. In the borough of Manhattan the additional subway facilities will be about 5 times those provided by the existing subway. In explaining the various advantages which will be derived by the public, the Commissioners mention that there will be three additional tunnels under the East River between Brooklyn and Manhattan. The facilities in the Bronx will be more than quadrupled.

The new subways will show great improvements over the existing subway in many details. Instead of all four tracks being placed in one tunnel, there will be two separate tunnels with two tracks in each. Where there are only two tracks they will be separated by a partition wall. Strict provisions for minimising inconvenience to property owners during construction are inserted in the contracts.

The contracts for working the lines made with the two companies will run for 49 years from January 1, 1917; this to apply to the old lines as well as the new. The leases for the extensions of the elevated lines will run for 85 years. Provision has been made for equal sharing of profits with the city, after deductions of a large number of specified items have been made from gross receipts. Ample provisions are made for securing to the city the necessary control over expenditures by either company in the construction, equipment, maintenance, and operation of the lines. In the dual system of rapid transit the Public Service Commission believe that they have solved the present rapid transit problem of New York.

## VEHICULAR TRAFFIC AND TRACK MAINTENANCE.

Mr. William Baxter, 142, Newhaven Road, Leith, writes to us at considerable length on the above subject, the occasion being a recent article in these pages. One of his objects is to show the success which has attended the use of his chilled iron protectors in preventing the wear of the paving setts next the rails of tramways. It should be noted that the protectors consist of iron plates on edge between the setts.

Mr. Baxter writes, in brief, as follows:

There are many systems where heavier foundations have been adopted, but attrition and crushing are more or less common, hence it would appear that heavy foundations alone are not a lasting solution to the matter.

Attrition alongside of rail has been a source of endless trouble since the introduction of rails in public thoroughfares. Fully 40 years ago chilled blocks were introduced and largely used on many important systems with more or less satisfactory results according to the class of workmanship and material employed, and they undoubtedly for many years defied attrition, but they had several very material drawbacks. They cost from £1,500 to over £2,000 per mile of single track. The vehicular traffic hammered them and the setts down below the level of the rail tread, leaving matters, with the exception of attrition, much in the same condition as we find exists to-day.

As an illustration of how attrition alongside of rail can be avoided and the life of the rail tread prolonged, Fig. 1 shows track in which chilled protectors have been in for one year. This track, because of excessive vehicular traffic, required margins repaired six months after being first put down. Fig. 2 shows the same part

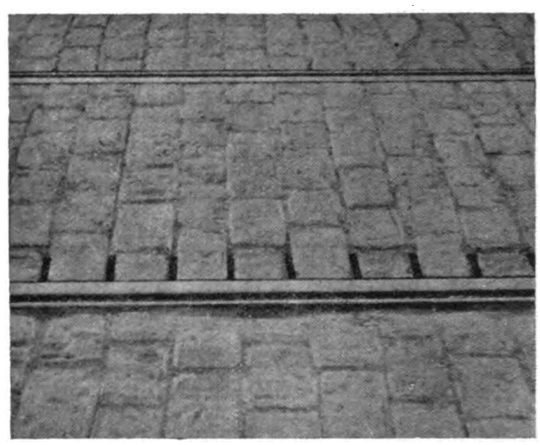

Fig. 1.

of track taken seven years after the first repair without further cost or repair and still in good order.

Fig. 3 shows track with wood margin and protectors

Fig. 2.

and granite setts in continuation without protectors. The part marked A is the wood margin with chilled protectors over five years down. B shows granite setts renewed twice in five years (without protectors), while C are granite setts with protectors down seven years (centre of track since repaired).

Fig. 3.

The above proves that wood paving when the work is well done lasts longer and gives a better surface than any granite, and that with the heaviest of motor and all kinds of vehicular traffic common to a large shipping port. The maintenance of track has always been under £50 per mile. It is claimed that without exception where the workmanship and materials are what one would reasonably expect, all that anyone could desire has been the result from a maintenance and financial point of view.

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# POINTS IN REGARD TO POWER GENERATION.

## STEAM TURBINES *v.* GAS ENGINES.

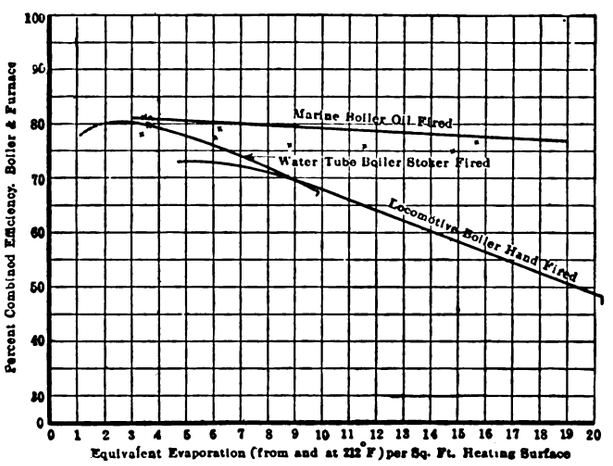
At the meeting in Atlantic City during October of the American Electric Railway Engineering Association, an interesting report was presented by the Association's Committee on Power Generation.

On this subject the committee stated that on account of the low first cost and high economy of steam turbine generating stations the possible economy of gas engines and gas producers is so small that there is little general interest in this subject for the member companies. From information in the hands of the committee it is the belief that with gas engine plants costing $90 per KW. or more, as compared with steam turbine plants at $50 per KW., the saving in the higher economy of the gas engine would not be sufficient to offset the additional fixed charges, except in cases where the cost of coal was from $6 to $8 per ton. The report was accompanied by appendices, from which the following is taken.

### Peak Loads.

In the reports of this committee for the years 1910, 1911, and 1912, the important bearing of fixed charges to the total cost of plant output for various load factors was clearly brought out, as operating costs do not materially change for the various load factors. Except in a few cases where there is an excessive and unnecessary amount of standby apparatus installed, the only portion of the power-station in which a reduction in first cost and the related fixed charges can be made is in the boiler room. Here the reduction in cost must be made by securing an increase in the steaming capacity of the boiler plant.

Curves showing the combined efficiency of boiler and furnace when operating at various rates of evaporation per square foot of heating surface are shown in the accompanying illustration. All of these curves are continued to the present known maximum rate of operation.


Percent Combined Efficiency, Boiler & Furnace
100
90
80
70
60
50
40
30
0
Marine Boiler Oil Fired
Water Tube Boiler Stoker Fired
Locomotive Boiler Hand Fired
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Equivalent Evaporation (from and at 212° F.) per Sq. Ft. Heating Surface

**Relation of Steam Boiler Efficiency to Capacity.**

The curve showing the performance of the marine boiler represents work recently done under the direction of the Navy Department at the League Island Navy Yard, and, so far as known, represents the highest performance, both as to rate of evaporation and efficiency, yet obtained with this type of boiler. The performances of the locomotive and marine boilers are included to show the great possibilities for improvement in power plant operation, both in the direction of securing greater output from the installed boiler plant and better economy in its operation.

By reference to the curve, it will be noticed that the combined boiler and furnace efficiency at the usual rating for stationary boilers, 3·45 lb. per sq. ft. of heating surface per hour, is 80 per cent; if the boiler and furnace are worked at double rating the efficiency is 74 per cent. This performance, of course, represents conditions obtaining at a constant rate of working, and in the every-day operation of power-stations the combined efficiency rarely exceeds 70 per cent., which is due to the losses that occur during the period of light loads when the boilers are banked or held in reserve. By operating at higher rates during peak-load periods the number of boilers that must be banked at the time of light loads will be less, and consequently the losses that occur at such times will be reduced.

To show that the total cost of plant output is not increased, but on the contrary is decreased, with the higher rates of the working of the boiler plant, it may be said that the boiler room portion of the ordinary power plant costs about $30 per kilowatt when boilers are installed on the basis of operation at rated capacity. The cost can be reduced to about half this amount if the boilers are installed to operate at double rating during the peak-load periods, thus reducing the first cost of the plant by, say, $12 per kilowatt. The saving in fixed charges on this amount, at 12 per cent. per annum, would therefore amount to $1·44 per year on each kilowatt of installed capacity.

Estimating the yearly load factor at 27·5 per cent., which corresponds to an annual output of about 2,500 kilowatt-hours per week per kilowatt of installed capacity, the saving in fixed charges becomes 0·58 mill per kilowatt-hour. The coal consumption per kilowatt-hour of the plant will be increased in an inverse proportion to the boiler efficiency at the two rates of working, and there will be required, if the plant is worked at double rating during peak loads, 80/74 of the coal at normal rating. Such a plant would operate at 2 lb. of coal per kilowatt-hour under normal operation, requiring therefore 5,000 lb. of coal per year per kilowatt of installed capacity, which at $2·50 per net ton amounts to $6·25 per year. The annual cost for fuel at the higher rate of operation would therefore be 80/74 of $6·25, an increase of 50 cents per year for fuel. The net gain at the higher rate of working would therefore be nearly $1 per year per kilowatt of plant capacity.

### Suggested Arrangement of Automatic Relays and Apparatus to Protect Power Plants from Shutdown.

The success of any method of protecting a power system from shutdown is dependent upon the selective elimination of the faulty section and the maintenance of service in the remainder of the system with the least possible disturbance in voltage and frequency. The problem of cutting out an overloaded section under normal conditions of load and power factor is simple. The real test of a protective system is its ability to isolate a damaged section when a short-circuit or other trouble occurs with attendant circumstances of heavy power surges, low power factor, and reduced voltage.

To limit the heavy rushes of current which occur at times of short-circuit and to prevent shutdowns, a form of self-inductant reactance should be employed in conjunction with a suitable form of automatic relay. This reactance, unless inherent in the apparatus, would preferably take the form of an open coil without iron in the magnetic circuit and have a cross-section designed to secure the maximum self-induction, such as can be easily secured and installed at comparatively low cost; these coils to be placed directly in series in those parts of the system in which it is desired to limit the short-circuit current.

Where modern turbo-generators are installed, with at least 6 per cent. internal resistance, additional internal reactance may not be required. In most of the earlier machines, both turbines and transformers, the internal reactance was made as low as possible for the purpose of improving the regulation, but with the result that the short-circuit current was in some cases as high as 40 or 50 times full-load current. This, of course, is the maximum instantaneous current at the moment of short-circuit and dies down, decreasing quickly as the armature reaction builds up, counteracting the field flux and reducing the generator voltage. Reactance in the generator leads, besides protecting the generator from external short-circuits, has the additional advantage in case of trouble in the generator itself that it interposes an impedance between the bus and the fault, thereby reducing the shock on the system.

In the case of short-circuits occurring in the feeders or transmission circuits beyond the generator buses, a reactance located in the feeder itself is the most economical point of installation from the standpoint of minimum voltage drop under normal operating conditions, for the generator reactances are all in parallel between the source of electromotive force and a short-circuit on any feeder, while a feeder reactance is in series between the generator and a short-circuit on the feeder. Another advantage of having part of the reactance in the feeder circuit is that the busbar voltage is subjected to less disturbance when a short-circuit does occur owing to the interposition of the reactance between the bus and the short-circuit, and the stability of the system is hereby increased. An additional advantage results when a feeder is used as a tie line to other generating stations, or when it feeds synchronous apparatus, as a reactance in this line limits the amount of reverse power fed back from the other stations when a short-circuit occurs on one station feeder.

In stations of large capacity having sectionalised busbars and tie lines to other stations, a reactance between the bus sections or in the tie between stations or groups of machines permits a much greater total generating capacity to be operated in parallel with the same factor of safety in switching equipment and limits the area of the system over which any disturbances extend.

To overcome the objection of poor regulation and power factor caused by reactance there is sometimes installed an additional short-circuiting switch so connected as to shunt the reactance, and provided with an automatic instantaneous device to open the switch and cut in the reactance in case of short-circuit. The objection to this, however, is that the reactance is out of the circuit when trouble occurs and therefore does not necessarily reduce the shock to the system.

Where the generators are Y-connected on large underground systems, a further protection from shutdowns due to surges may be secured by grounding the neutral. This limits, even when solidly grounded, the normal voltage between any conductor and ground to approximately 58 per cent. of that between conductors—thus protecting the insulation

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of apparatus. A resistance inserted in the ground connection limits the flow of current and shock to the system, and, for the underground systems, grounding the neutral through resistance is in general advisable, but, to take the other extreme, grounding the neutral on long-distance overhead systems is, in general, not advisable—the primary difference in the two extremes being the fact that one is an underground cable on which a fault to ground generally rapidly develops into a short, whereas the other is an overhead circuit of three separate wires and faults to ground can often be located and remedied without interruption of service; also on underground cable systems there are generally more spare cables.

RELAYS.

To isolate the affected portion of the system and protect the station from shutdown, reverse current, or reverse energy, relays operated from transformers in the generator leads, for the automatic operation of generator oil switches, should be installed. These relays should have the following operating characteristics: (*a*) Should permit of limited reversal without relay tripping in order to allow leeway for motoring when the generator is first put on bus before picking up load. (*b*) Operation at predetermined reverse load setting should be instantaneous. (*c*) Must not operate on overloads. (*d*) Must operate on reversal even with low voltage and low power factor. (*e*) Must not operate on over-voltage. In general, overload relays should not be installed to operate generator switches, and where they are installed they should be equipped with a definite time-limit feature, arranged so as not to operate under any condition of short-circuit, except at a given time setting.

In order to cut off from the bus a generator having an internal short-circuit, an adaption of the Merz-Price system of balance current has been proposed consisting of two transformers on each leg of the generator winding, one of the two being outside of the generator and the other being inside the star connection. Normally these two transformers are in opposition, and no current flows through a relay placed in the curcuit, but in case of internal short-circuit there is more current flowing in one transformer than in the other, and the relay will operate, cutting the generator off from the bus and opening the field circuit.

At the power-house end of feeders, relays of the overload type, with adjustment for the time limit, should be used. When feeders are operated in parallel at the sub-station end relays of the reverse energy type should be installed at the sub-station. On systems having sub-stations fed directly (sub-stations not in tandem or on ring system) and where the service is not such as to demand that the power supply be maintained at all hazards, inverse time element relays should certainly be employed at the generating station rather than the use of definite time relays. In cases of larger and more important but relatively short tie lines between generating stations, reverse current or energy relays should be installed in each station, interconnected so as to operate immediately upon reversal of energy or current at one end of the line. In general, for transmission and long tie lines, inverse time element relays should preferably be furnished of such characteristics that under all conditions of overload or short-circuit the successive relays maintain their selective sequence.

Some remarkable developments have been made within the last few years in the distant control of valves either by electricity, air, or steam. The perfecting of these different systems of control after an initial attempt has been exceedingly rapid, and the electrically-operated system has perhaps been the more pronounced in its advancement and adoption. Several interesting installations have been successfully completed with special reference to the operation of valves between boilers and headers and sections of the header, thus permitting any break in the pipe to be isolated by closing the necessary switches, which may be placed at any remote point for convenient operation. In one installation, a plant of 15 boilers, the cut-off valves from the boilers to the main header are controlled from the engine room with the switches conveniently placed, numbered distinctly and in plain view. In case of the loss of a tube, some one formerly had to mount the boiler and endeavour to locate the valve, frequently among clouds of steam, and by the time the valve was located and the boiler cut out the steam would be down on account of other boilers discharging more or less into the boiler with the damaged tubes. Employees have been scalded through this method or want of method.

In another plant, operation of the turbines is carried on from the switchboard, and steam is admitted and controlled electrically on all units. The governors of all the turbines are also controlled electrically, while in another part of the plant air is used for remote control of valves for shop purposes.

**Extensions at York.**—Powers will be sought next session for an extension of the tramways through Walmgate to Hull Road, and to the centre of Acomb Village, together with railless trolley car installations to Heworth; from Nessgate along Huntington Road to Haxby Road; to the Leeman Road district via Bootham and Clifton, and into the Burton Road district. Alderman Meyer, chairman of the Tramways Committee, estimates the cost of the extensions, which will practically double the present mileage, at about £72,000.

## BALL BEARINGS AND THEIR APPLICATION.

(COMMUNICATED.)

Without the slightest doubt cycle manufacturers entirely owe their success to ball bearings, for without them the pedal bicycle would never have become a commercial success. No one would think of buying a cycle now unless it were fitted throughout with ball bearings, and it would be an undoubted advantage to the users of all classes of machinery, no matter how large or how small the machine may be, whether it be for rough heavy work or for light accurate work, if ball bearings were fitted throughout." It is now being realised that plain bearings are not only a continual source of expense and trouble, but also that the life of the bearings governs in a large measure the life of the machine.

Among the serious drawbacks to plain bearings are the necessary constant attention, oiling, rapid wearing, noise, risk of running hot, and finally renewing, where possible to do so. This means stoppage of machinery and additional expense. In a great many cases, plain bearings have been made in such huge proportions in comparison to their duty, that the frictional loss in power alone can be reduced from 90 to 95 per cent. by the application of ball bearings, and therefore the importance of the application of ball bearings to all classes of machinery is at present engaging the attention of the engineering world.

For a number of years, after the bicycle boom, engineers considered ball bearings unsuitable for anything except small parts of light machinery running at high speeds, and generally speaking the main idea in using them at all was to save the space taken up by bearings of the common type. Thus they were able to lighten their machines and also to preserve a much neater appearance. During these years, manufacturers of ball bearings were not idle. No expense was spared in experimenting with bearings for all purposes, particularly for heavy loads and high speeds. After years of scientific research and study, combined with years of practical tests under almost every conceivable condition, they are now able to offer a ball bearing for any duty and to work satisfactorily under almost any conditions.

The importance of correct housing can be easily understood, a very great percentage of failures being due to bad mounting. Almost every ball bearing manufacturer will prepare drawings showing the correct method of fitting and housing for any particular case, and those who are fitting ball bearings for the first time will do well to obtain such information.

It may be safely asserted that ball bearings can be successfully fitted to almost every class of machinery, and it must be borne in mind that wherever these bearings are fitted all their advantages are consequently embodied in that plant, machinery, or vehicle. The advantages of ball bearings over any others are very great. In the first place, they are almost frictionless, and therefore lubrication is reduced to a minimum. Under actual test a ball bearing will run much freer without lubrication than with, but a little lubrication is necessary to keep the balls and races from getting rusty, and provision should always be made wherever possible for the bearings to run in an oil bath, so that moisture cannot get to them.

Being almost frictionless, there is practically no wear taking place. This makes ball bearings ideal for all classes of machinery, especially gearing, such as motor car drives, gear boxes, electric motors for tramcars and light railways, etc. Ordinary bearings used in such positions sooner or later become a source of trouble in themselves, as the wear affects the shaft centres, and consequently causes the teeth of the wheels to break, and thus in turn ruin the whole gearing. Ball bearings also allow machines to be made lighter, and in many cases ensure reduction in cost of material. They never run hot, and allow such freedom to the machine that it acquires a high degree of sensitiveness. The horse-power saved is usually about 75 to 90 per cent. of the total amount of frictional loss absorbed by ordinary bearings.

It is most important that ball bearings should be protected against grit, dust, and moisture. Great care should be exercised when mounting to see that end thrust does not come on radial bearings unless a bearing is used which is designed for thrust as well as radial duty. Shafts mounted on ball bearings will run at a much higher speed. A saving of 90 per cent. on the lubrication bill may be effected by the use of ball bearings with heavy loads or high speeds. The lubrication, however, must be free from both acid and alkali.

The object of ball bearing manufacturers has been to design their bearings so that they are self-contained, that is, after leaving their works there shall be no need for adjustment. The Skefko S.K.F. ball thrust bearings are also manufactured on the self-aligning principle, as it is contended that it is impossible for the ordinary users to fit ball bearings with anything like the degree of accuracy possessed by the bearing itself, and, therefore, any inaccuracy in fitting must be allowed for in the bearing. The Skefko S.K.F. Ball Bearing Company, Limited, is the English works of the well-known S.K.F. Ball Bearing Company, of Gothenburg, Sweden. Full particulars of all their patent radial and thrust bearings, together with other useful information regarding design, fitting, and use of ball bearings, can be obtained gratis from them on application to their chief office at Luton.

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## ELECTRIC CAR HEATERS.

Some new types of electric car heaters have recently been placed upon the British market by Messrs. Watlington and Company, of Milton Street, London, E.C. As will be gathered from the following particulars and illustrations, the new designs contain many improvements over the older types, chief amongst them being reduction of weight, improved ventilation, and perfect insulation. From a variety

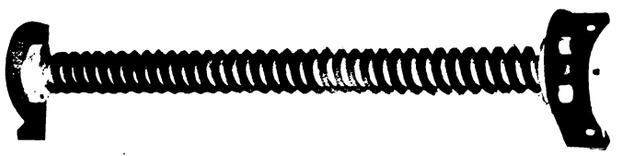

Fig. 1.

of causes comparatively little headway has been made in this country with electric car heating, although on the Continent and in America this system has been extensively used, no less than 40,000 cars running in city and interurban service being fitted with the type of heaters now described.

In the construction of the new types of electric heaters pressed steel has been substituted throughout for cast iron. This renders them practically indestructible, and reduces the weight from 30 per cent. to 50 per cent., when compared with the older types. Spot welding is employed in the manufacture of the heater cases, and also in attaching the hangers to the cases. This, of course, eliminates a considerable number of rivets which heretofore were used, and adds to the attractiveness of the heater. A perfect standard of sizes is maintained so as to ensure interchangeability of parts. The heater coils are made of specially selected galvanized iron wire, which experience has shown to be the best material for this purpose; these are perfectly supported

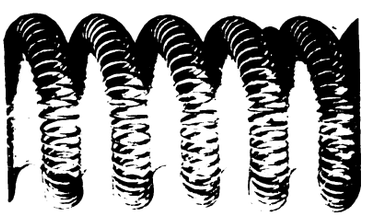

Fig. 2.

at every point and no vibration is possible. The spindle supporting the coil consists of an iron rod, on which are strung porcelain tubes which are so designed and fitted that a helical groove extends from end to end (Fig. 1). Specially designed eccentric porcelain bushings are placed on either end of the rod, and pass through the heater end plates. The wire for the heater coil is wound in a close spiral spring between the ridges on the porcelain spindle under tension. This method of construction gives the greatest amount of wire in the given space, and disposes every portion of the large surface presented so that the maximum quantity of air comes in contact with it (Fig. 3). The melting point of the heater coil is 2,925 deg. Fahr., and as the maximum temperature in service is only 400 deg. Fahr. it will be seen there is a large factor of safety.

An important feature of the new type of heater is the large amount of ventilation afforded for the radiation of heat. As lack of ventilation not only reduces the life of the heating element, but also

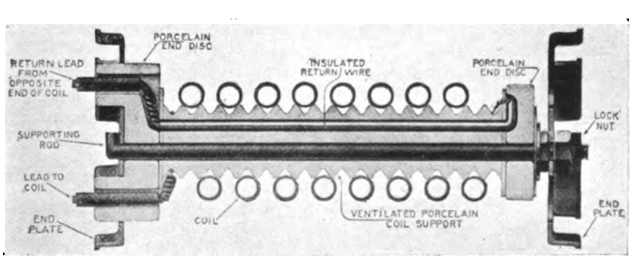


Fig. 3.—Sectional View of Heater Spindle.

causes the heater to operate at a high temperature, it will readily be seen how important this point is in the selection of a heater equipment.

The illustrations clearly show the formation of the heater coils, which embody ventilation spaces between each of the porcelain supports and the coil, and between each turn of the coil. The porcelain tubes have a glazed finish, which prevents the collection of dust. The loss of heat at the back of truss plank and panel heaters is prevented by the use of a circulating air space between the heater coil and the back; this method insures the delivery of all heated air into the car body.

The new designs embrace three types of heaters, viz., truss-plank heaters, cross-seat heaters, and the panel heater. Each of these is operated at 600 volts, and is made up with the standard heating elements. The first of these, when installed along the truss plank, occupies very little space, and when used in a continuous row provides the best possible distribution of heat. This type of heater is furnished without connecting wires, as the connections are made to binding posts at the ends of the heater coil. The cross-seat type is fitted with hangers of the universal pattern, which permit of the heater being installed under any of the different types of seats. It is claimed for this type that the best results are obtained by installing a heater under every seat, as by this arrangement they can be operated at a low wattage. In this type of heater all connection wires are brought out of the heater at one end; this is accomplished by running an insulated copper wire through the specially cored hole in the porcelain spindle, connecting it at one end to the heater coil, and at the opposite end to the supply wire. The arrangement of the connections, as well as the coil supports, will be seen from the sectional view shown in Fig. 3, and in the complete unit, as shown in Fig. 4. The heater shown in Fig. 5 contains two heating elements; the steel hangers are firmly

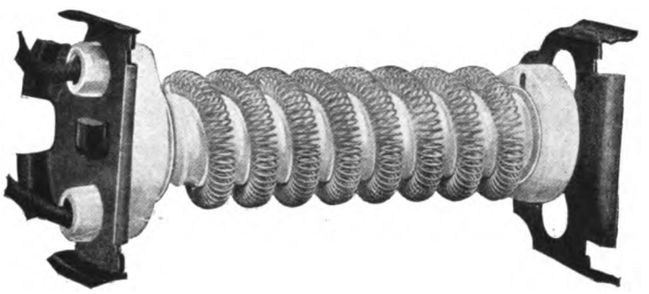

Fig. 4.

welded to the case, and are of the type which permit the heater to be readily applied directly to any type of cross seat.

The panel heaters are designed for cars with longitudinal seats, being placed in openings cut in the risers or heel boards. Steel front plates are used having perforations which permit of a free passage of the heated air into the car. The front plate of the heater will thus be flush with the riser, which should be well set back from the edge of the seat so as to prevent pocketing the heat. This heater is extremely light in weight, but strongly constructed, the front, back, and ends being of pressed steel. A junction box is provided for each end of the heater, so that when the connecting wires are carried in conduit, the conduit is held in place by a clamp at this point. Connections are then made to the binding posts on the heater coils, and the junction cap bolted into position. This type of heater is made in three sizes.

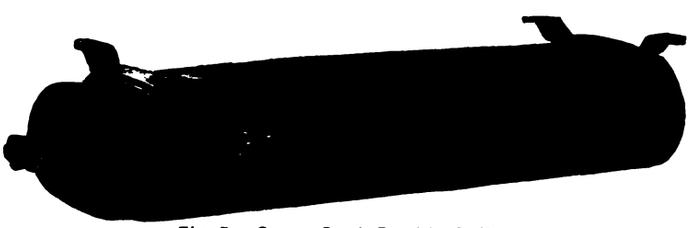

Fig. 5.—Cross-Seat Double-Coil Heater.

High-tension heaters for voltages ranging from 1,200 to 1,800 are also made in all three types. In the single-coil truss-plate type a deflector plate is fitted, which prevents the possibility of passengers receiving shocks; the heater coil cannot be reached through the perforations from outside the heater. In the double-coil cross-seat type, a double steel case is provided. The perforations are so arranged as to make it impossible to reach the heating elements from the outside. The junction box, which is of the split type, is held in place by the heater cases. The panel type for use on lines with 1,200 to 1,800 volts also has a double case with the perforations in each protected by solid metal. It is claimed that this method of construction offers no hindrance to the free circulation of the heated air, and positively prevents any contact with the heating elements from outside the case.

Thermostatic regulation for the 600-volt type of heater is claimed to be one of the most important developments in connecton with electric car heating, as by means of this system waste is absolutely prevented. The thermostat never allows any more current to be used by the heaters than is necessary to bring the car up to the required temperature, when this temperature is reached the current is automatically cut off. The temperature is maintained within 2½ degrees of the predetermined point, and thus gives a range of 5 degrees between the cutting-in and cutting-out temperatures.

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# RATING APPEAL IN THE HOUSE OF LORDS.

COMMENT ON REMARKS OF LORD MOULTON.

A MISUNDERSTANDING OF THE LIGHT RAILWAYS ACT.

We have received from the Tramways and Light Railways Association the following correspondence which has passed between the chairman of the Association and the Lord Chancellor with regard to some remarks made by Lord Moulton when delivering judgment in the House of Lords in the rating appeal case of Tottenham Urban District Council *v.* Metropolitan Electric Tramways Company in June last. The judgment was reported in our issue of August 14, 1913.

The Right Honble. VISCOUNT HALDANE, K.T.

MY LORD,—The attention of the Tramways and Light Railways Association has been drawn to the expressions used by Lord Moulton in his judgment in the case of the Tottenham Urban District Council and Metropolitan Electric Tramways, Limited.

This was an appeal case on the question of the rating of tramways, and while my Association holds very strong views both on the judgment itself and the manner in which Lord Moulton arrived at the decision and announced it, I only desire on this occasion to draw attention to a complete misrepresentation by Lord Moulton of the action of tramway promoters under the Light Railways Act due to his ignorance of the history of the Act itself.

Lord Moulton in his judgment said:

"Tramway promoters were astute enough to see that undertakings which were purely and simply schemes for the construction of tramways in the ordinary sense of the word, might be put forward under the guise of being schemes for the construction of light railways, and that *if they could successfully elude the vigilance of the authorities*, they would thereby gain for the tramways the exceptional privileges intended only for undertakings of a widely different character. In this attempt they were only too successful, and by reason of *what I have no hesitation in regarding as an abuse of the Act*, schemes were sanctioned under the authority of the Light Railways Act, 1896, for the construction of what ought to have been regarded as tramways, and subjected to the carefully considered conclusions of the Legislature in respect thereto which are embodied in the Tramway Act."

This statement is both offensive and unjust. Mr. Ritchie, President of the Board of Trade, in introducing the Light Railways Bill, said:

"Under this bill a scheme for the construction of light railways might be proposed by local authorities such as a county, *town*, or district council, or by a railway company, a *tramway* company, a company *ad hoc*, or a combination of these."

He went on further to say:

"It was, perhaps, not generally known that local authorities could not at present make *tramways* without obtaining Parliamentary powers in some form or other, and even when such powere were obtained, they could not work the tramways except in special cases. This bill sought to remove those disabilities."

Mr. Ritchie also said:

"The bill of the Government would . . . afford facilities for making branches of existing railways upon a large scale, but with a different gauge if it were desired, and also for making such railways as in Belgium."

These Belgian railways are practically the same as our tramways.

Lord Dudley, in introducing the bill into the House of Lords, said:

"The bill included not merely all tramways, but all railways which the Board of Trade thought might justly be brought within its scope."

"*It certainly included tramways in towns*, and it might include trunk lines throughout the country."

If Lord Moulton had studied the history of the Light Railways Act, he would at least have refrained from making offensive remarks about those who have built up a great and beneficial industry under great difficulty and discouragement, and a knowledge of the real facts might have prevented him from adopting the biassed and prejudiced attitude which he thought fit to maintain throughout the hearing of the appeal.

I am, my Lord, your obedient servant,

(Signed) ARTHUR STANLEY, Chairman.

September 24, 1913.

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MY DEAR STANLEY,—The Lord Chancellor has read your letter of the 24th inst. on behalf of the Tramways and Light Railways Association, and wishes me to write you in answer.

I am afraid that if the judge in a cause, after the judgments were delivered, were called upon to hear the criticisms of unsuccessful suitors, there would soon be an end of all legal decisions. The inconvenience of such a practice would be specially obvious in the case of the Final Court of Appeal, whose judgment is accepted as the final settlement of the law.

Believe me, yours truly,

(Signed) A. G. C. LIDDELL,

September 30, 1913. Private Secretary.

The Right Honble. VISCOUNT HALDANE, K.T.

MY LORD,—I beg to acknowledge the receipt of your reply to my letter of the 24th ult.

Mr. Liddell states that you read my letter, in which case I fear I must have expressed myself badly, as you have evidently misunderstood its meaning. If you will kindly refer to it again you will see that I did not criticise or find fault with the judgment in the case of Tottenham Urban District Council *v.* Metropolitan Electric Tramways Company, but that I thought it right, on behalf of those interested in the tramway industry, to point out to you that the statement of your colleague, Lord Moulton, to the effect that tramway promoters had made a wrong use of the Light Railways Act (constituting according to him, "an abuse of the Act") was absolutely unwarranted, and I further pointed out that even a cursory study of the history of the Act would have saved Lord Moulton from making a statement—in which you presumably concurred—which was both unfounded and unfair.

The judgment is irrevocable, and the only way in which we can make known our emphatic protest against the manner in which we have been treated by Lord Moulton and yourself is by publishing this correspondence, which I propose to do, after a few days' delay in case you should wish to reply to this letter.

I am, my Lord, your obedient servant,

(Signed) ARTHUR STANLEY, Chairman.

October 6, 1913.

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House of Lords, S.W.,

October 11, 1913.

DEAR STANLEY,—I am desired by the Lord Chancellor to acknowledge the receipt of your letter of the 6th inst.

I am, yours truly,

(Signed) A. G. C. LIDDELL.

Hon. Arthur Stanley, M.P.

# TRAMWAY AND RAILLESS PROPOSALS.

BOLTON.—A bill is to be promoted for tramway extensions.

BOURNEMOUTH.—A considerable length of track is to be doubled and relaid, and the manager has been directed to report on the subject of providing omnibuses in connection with the tramways services.

BURNLEY.—The manager has been asked to report on the question of providing a tramway between Stoneyholme and Brunshaw Bottom.

CARDIFF.—For the purpose of preventing congestion, the track in Ninian Road is to be doubled at a cost of £6,010.

DUNFERMLINE.—In connection with the Council's town-planning scheme at Rosyth, the naval base, Mr. Balfour, of the Dunfermline and District Tramways Company, has stated that when the tramways are extended to the dockyard, the company would pay £1,000 per mile of double track, and £500 for single track, for road making on all sections of the roads where the tracks could, without detriment, be laid on ballast.

EDINBURGH.—A proposal for using the self-propelled car on the city tramways, and for its working in connection with the existing cable service, will be submitted to the Corporation by the Tramways Committee. A proposal for a new route from Craiglockhart cable terminus to Fir Hill, and to the existing tramway at Comiston Road, a distance of 5½ miles, has been postponed. Another scheme provides for an extension to Corstorphine, passing the Zoological Gardens, a distance of 1 mile 660 yards.

NEWCASTLE-ON-TYNE.—By the Tramways Committee a recommendation is to be brought forward in favour of promoting a bill to extend the tramways to Benton, in the district of Longbenton Council, and to run motor omnibuses from the terminus to the various centres of the Longbenton Council's area.

NEWPORT.—A scheme for running railless trolley cars within and without the borough, in the lower part of the Western Valley, is before the Tramways Committee.

NORTHAMPTON.—In February next the work of extending the tramways to Far Cotton, and doubling the Kingsthorpe Road section, is to be begun, the Corporation arriving at this decision at their October meeting. The Tramways Committee were instructed to consider the question of erecting shelters at various points on the present system.

NOTTINGHAM.—There is to be an extension of the tramways along Derby Road. It is not expected that the work will be started until March next.

PLYMOUTH.—It is proposed to apply for a Provisional Order for tramway extension to Crownhill at an estimated cost of £24,700, inclusive of four cars, and to Laira at an estimated cost of £30,348, inclusive of five cars. Owing to the cost which would be involved in obtaining an Act for running railless trolley cars, as against the small cost entailed by a Provisional Order for tramway extensions, the committee regretted that they were unable to submit reliable estimates relating to the former system.

PRESTON.—The Tramways Committee recommend the promotion of a bill for powers to extend the tramways on three routes.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Year Ended. | Electric Traction Inaugurated. | System. | Line open (single track). Mls. Chs. | Borrowing Powers. | Borrowing Powers Exercised. | Unexhausted Borrowing Powers. | Total Capital Expenditure. | Capital Expenditure per Mile of Single Track. | Loans Outstanding. | Loans Repaid and Sinking Fund. | Depreciation, Renewal and Reserve Funds. | Gross Receipts. Traffic. | Other. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aberdeen ... | †May 31, 1913 | Dec., 1899 | E. | 27 66 | 350,000 | ... | ... | 350,590 | 12,599 | 192,660 | 157,929 | 143,468 | 79,125 | 1,041 | 80,166 |
| Accrington ... | †Mar. 31, 1913 | Aug., 1907 | ,, | 10 53 | 169,675 | 134,670 | 35,800 | 134,525 | 12,619 | 116,976 | 17,694 | 13,200 | 27,419 | 403 | 27,822 |
| Ashton-u-Lyne.. | †Mar. 25, 1913 | Aug., 1902 | ,, | 8 15 | 130,070 | 108,099 | 21,971 | 108,099 | 13,203 | 83,240 | 24,859 | 1,650 | 21,340 | 551 | 21,891 |
| Ayr ... ... | †May 15, 1913 | Sept., 1901 | ,, | 7 49 | ... | ... | ... | 85,445 | 11,224 | 78,933 | 18,044 | 14,918 | 15,626 | 670 | 16,296 |
| Birmingham ... | †Mar. 31, 1913 | Jan., 1904 | ,, | 108 32 | 2,302,001 | 2,089,194 | 212,807 | 1,981,588 | 18,280 | 1,874,109 | 215,084 | 220,369 | 574,248 | 7,318 | 581,566 |
| Blackburn ... | †Mar. 25, 1913 | Mar., 1899 | ,, | 24 63 | 408,174 | 342,474 | 65,700 | 334,924 | 13,512 | 254,600 | 167,381 | 1,000 | 63,440 | 3,243 | 66,683 |
| Blackpool ... | †Mar. 31, 1913 | June, 1899 | ,, | 21 31 | 453,798 | 301,796 | 152,002 | 301,796 | 14,115 | 301,796 | 114,086 | 15,126 | 73,155 | 1,011 | 74,166 |
| Bolton ... ... | †Mar. 31, 1913 | Dec., 1899 | ,, | 47 17 | 552,208 | 551,019 | 1,189 | 559,107 | 11,842 | 338,439 | 162,580 | 55,901 | 135,149 | 1,313 | 136,462 |
| Bradford ... | †Mar. 31, 1913 | July, 1898 | ,, | (h)103 69 | 1,269,568 | 982,398 | 287,170 | 1,002,566 | 9,653 | 607,928 | 384,335 | 89,072 | 280,758 | 18,345 | 299,103 |
| Brighton ... ... | †Mar. 31, 1913 | Nov., 1901 | ,, | 17 15 | 358,620 | 279,000 | 80,715 | 277,914 | 16,170 | 223,556 | 55,653 | 6,708 | 51,780 | 2,018 | 53,798 |
| Burnley ... ... | †Mar. 31, 1913 | Dec., 1901 | ,, | 22 13 | 388,052 | 339,125 | 48,927 | 231,601 | 10,450 | 179,498 | 56,652 | 48,212 | 79,641 | 249 | 79,890 |
| Burton-on-Trent | †Mar. 31, 1913 | Aug., 1903 | ,, | 9 60 | 108,632 | 104,562 | 4,070 | 106,225 | 10,895 | 50,583 | 53,979 | 8,966 | 14,383 | 1,304 | 15,687 |
| Bury ... ... | †Mar. 31, 1913 | June, 1903 | ,, | 21 14 (b)13 21 | 407,800 | 280,775 | 127,025 | 283,005 | 13,365 | 262,135 | 42,877 | (l)24,571 | 67,370 | 284 | 67,654 |
| Chester ... ... | †Mar. 25, 1913 | April. 1903 | ,, | 6 35 | 92,991 | 82,380 | 10,611 | 82,934 | 12,883 | 69,727 | 12,785 | 2,968 | 12,272 | 458 | 12,730 |
| Chesterfield ... | Mar. 31, 1912 | Dec., 1904 | ,, | 5 8 | 95,000 | 70,500 | 24,500 | 69,575 | 13,642 | 60,289 | 10,211 | 5,031 | 11,709 | 496 | 12,205 |
| Colchester ... | †Mar. 31, 1913 | July, 1904 | ,, | 7 75 | 70,748 | 69,555 | 1,193 | 69,401 | 8,743 | 53,425 | 17,049 | Nil. | 10,281 | 477 | 10,758 |
| Croydon ... ... | †Mar. 31, 1913 | June, 1906 | ,, | 19 10 | 287,689 | 287,689 | Nil | 284,847 | 14,894 | 230,968 | 87,264 | 42,453 | 90,543 | 1,921 | 92,464 |
| Darlington ... | †Mar. 31, 1913 | June, 1904 | ,, | 8 71 | 107,500 | 76,263 | 31,237 | 76,322 | 8,587 | 56,888 | 19,434 | 5,726 | 11,842 | 334 | 12,176 |
| Darwen ... ... | †Mar. 31, 1913 | Oct., 1900 | ,, | 7 13 | 93,400 | 86,300 | 7,100 | 86,300 | 12,048 | 57,330 | 28,280 | 7,450 | 14,244 | 1,176 | 15,420 |
| Derby ... ... | †Mar. 31, 1913 | July, 1904 | E. | 22 5 | ... | ... | ... | 242,785 | 11,004 | 157,213 | 85,572 | (d)4,486 | E 46,820 | 1,030 | 47,850 |
| | | | H. | | ... | ... | ... | ... | ... | ... | ... | ... | H 394 | 22 | 416 |
| Doncaster ... | †Mar. 31, 1913 | June, 1902 | E. | 12 42 | ... | ... | ... | 99,172 | 7,918 | 80,400 | 14,741 | 780 | 19,928 | 334 | 20,262 |
| Dundee ... ... | †May 15, 1913 | July, 1900 | ,, | 27 38 | (f) | 345,450 | ... | 352,663 | 12,835 | 262,038 | 83,411 | 71,823 | 63,395 | 1,650 | 65,045 |
| East Ham ... | †Mar. 31, 1913 | June, 1901 | ,, | 14 32 | 190,643 | 190,242 | 401 | 191,583 | 13,307 | 148,515 | 58,075 | 5,097 | 57,050 | 610 | 57,660 |
| Exeter ... ... | †Mar. 31, 1913 | April, 1905 | ,, | 7 0 | 106,000 | 86,111 | 19,889 | 86,111 | 12,301 | 69,376 | 17,209 | 5,915 | 16,748 | Nil | 16,748 |
| Gloucester ... | †Mar 31, 1913 | April, 1904 | ,, | 15 0 | 191,000 | 144,243 | 46,757 | 147,692 | 9,846 | 111,051 | 16,816 | 750 | 16,177 | 1,168 | 17,345 |
| Halifax ... ... | †Mar. 31, 1913 | June, 1898 | ,, | 54 70 | 449,263 | 412,876 | 36,387 | 414,246 | 7,549 | 299,480 | 105,948 | 27,379 | 104,947 | 1,026 | 105,973 |
| Ilford ... ... | †Mar. 31, 1913 | Mar., 1903 | ,, | 11 28 | 149,633 | 149,633 | Nil | 149,500 | 13,171 | 109,912 | 39,721 | 5,611 | 24,361 | 2,407 | 26,768 |
| Ilkeston ... ... | Mar. 31, 1912 | May, 1903 | ,, | 4 24 | 64,214 | 47,000 | 15,074 | 47,936 | 11,148 | 42,600 | 11,919 | 350 | 6,533 | 156 | 6,689 |
| Ipswich ... ... | †Mar. 31, 1913 | Nov., 1903 | ,, | 14 70 | 116,471 | 114,300 | 2,171 | 114,838 | 7,720 | 98,858 | 16,305 | 8,180 | 22,575 | 829 | 23,404 |
| Keighley ... ... | Mar. 31, 1912 | Oct., 1904 | ,, | 6 9 | 50,934 | 46,903 | 4,031 | 46,903 | 7,675 | 34,465 | 15,080 | 1,310 | 9,588 | 251 | 9,839 |
| Kilmarnock ... | †May 15, 1913 | Dec., 1904 | ,, | 5 47 | 65,000 | 52,625 | 12,375 | 53,191 | 9,519 | 44,766 | 7,379 | 4,017 | 8,543 | 248 | 8,791 |
| Kirkcaldy ... | †May 15, 1913 | Feb., 1903 | ,, | 8 45 | 213,000 | 96,748 | 116,252 | 96,749 | 11,025 | 80,333 | 16,415 | 4,161 | 15,712 | 494 | 16,206 |
| Lancaster ... | †Mar. 31, 1913 | Jan., 1903 | ,, | 4 65 | 60,000 | 51,550 | 8,450 | 43,432 | 9,022 | 36,200 | 13,838 | 3,000 | 5,437 | 143 | 5,580 |
| Leith ... ... | May 15, 1912 | Aug., 1905 | ,, | 17 73 | 275,000 | 235,000 | 40,000 | 235,000 | 13,119 | 193,200 | 42,257 | 302 | 33,851 | 842 | 34,693 |
| Leyton ... ... | Mar. 31, 1912 | Dec., 1906 | ,, | 18 40 | 306,427 | 305,821 | 606 | 295,526 | 15,977 | 256,643 | 40,906 | 3,360 | 61,496 | 1,172 | 62,668 |
| Lincoln ... ... | †Mar. 31, 1913 | Nov., 1905 | S. | 2 77 | 98,519 | 44,947 | 53,572 | 44,992 | 15,187 | 42,893 | 9,862 | (a) 1,600 | 6,717 | 128 | 6,845 |
| Liverpool ... | †Dec. 31, 1912 | Nov., 1898 | E. | 119 0 | ... | ... | ... | 2,015,193 | 16,934 | 1,245,282 | 1,012,873 | 430,509 | 631,071 | 13,103 | 644,174 |
| Lowestoft ... | †Sep. 30, 1912 | July, 1903 | ,, | 4 6 | 94,230 | 87,031 | 7,199 | 87,031 | 21,357 | 67,833 | 13,067 | ... | 10,781 | 17 | 10,798 |
| Maidstone ... | Mar. 31, 1912 | July, 1904 | ,, | 7 3 | 82,932 | 82,582 | 350 | 78,748 | 11,012 | 69,158 | 13,424 | Nil. | 9,279 | 518 | 9,797 |
| Manchester ... | †Mar. 31, 1913 | June, 1901 | ,, | 188 30 | 2,355,689 | 2,034,371 | 321,318 | 2,061,791 | 10,945 | 1,543,504 | 437,305 | 479,683 | 876,023 | 11,624 | 887,647 |
| Nelson ... ... | †Mar. 31, 1913 | Feb., 1903 | ,, | 3 69 | 38,000 | 37,832 | 168 | 37,832 | 9,795 | 30,118 | 7,714 | ... | 10,240 | 51 | 10,291 |
| Newport (Mon.) ... | †Mar. 31, 1913 | April, 1903 | ,, | 14 28 | 219,250 | 196,250 | 23,000 | 193,191 | 13,463 | 164,763 | 31,487 | 9,095 | 37,555 | 995 | 38,550 |
| Nottingham ... | †Mar. 31, 1913 | Jan., 1901 | ,, | 37 40 | 730,300 | 725,945 | 4,355 | 638,005 | 17,479 | 426,818 | 217,041 | 64,242 | 164,746 | 2,404 | 167,150 |
| Oldham ... ... | †Mar. 25, 1913 | May, 1902 | ,, | 28 6 (b) 8 31 | 516,925 | 440,204 | 76,719 | 442,174 | 15,750 | 320,725 | 118,217 | 2,135 | 108,003 | 2,574 | 110,577 |
| Perth ... ... | May 15, 1912 | Nov., 1905 | ,, | 6 40 | 90,000 | 77,650 | 12,350 | 77,829 | 11,539 | 64,790 | 13,678 | 1,034 | 9,689 | 412 | 10,101(e) |
| Plymouth ... | Mar. 31, 1912 | Sept., 1899 | ,, | 15 0 | ... | 188,752 | ... | 157,322 | ... | 92,636 | 97,320 | 10,848 | 37,083 | 830 | 37,913 |
| Pontypridd ... | Mar. 31, 1912 | Mar., 1905 | ,, | 8 48 | 136,019 | 135,885 | 134 | 136,896 | 15,919 | 112,862 | 22,899 | ... | 21,130 | 2,036 | 23,166 |
| Rawtenstall ... | Mar. 31, 1912 | May, 1909 | ,, | 15 71 | 196,159 | 182,933 | 13,226 | 181,096 | 11,401 | 169,971 | 12,962 | 2,150 | 24,063 | 1,018 | 25,081 |
| Rochdale ... ... | Mar. 31, 1912 | May, 1902 | ,, | (i) 40 2 | 356,991 | 347,782 | 9,209 | 351,831 | 15,347 | 347,782 | 71,729 | ... | 72,649 | 353 | 73,002 |
| Rotherham ... | Mar. 31, 1912 | Jan., 1903 | ,, | 12 0 | 228,550 | 155,000 | 73,550 | 154,589 | 12,882 | 132,835 | 46,413 | 18,123 | 35,724 | 133 | 35,857 |
| Salford ... ... | †Mar. 31, 1913 | Oct., 1901 | ,, | 75 64 | 1,050,666 | 723,669 | 326,997 | 723,672 | 9,599 | 536,791 | 258,977 | 45,699 | 260,365 | 486 | 260,851 |
| Southampton ... | Mar. 31, 1912 | Jan., 1900 | ,, | 17 62 | 277,259 | 239,715 | 37,544 | 247,977 | 13,951 | 169,010 | 70,726 | 18,497 | 63,849 | 2,260 | 66,109 |
| Southend-on-Sea | †Mar. 31, 1913 | July, 1901 | ,, | 11 49 | 130,000 | 129,961 | 39 | 143,808 | 12,384 | 116,940 | 12,784 | 3,045 | 34,453 | 465 | 34,918 |
| Southport ... | Mar. 31, 1912 | July, 1900 | ,, | (d) 10 63 | 292,000 | 196,500 | 95,500 | 118,708 | 11,004 | ... | ... | 417 | 18,642 | 402 | 19,044 |
| South Shields ... | †Mar. 31, 1913 | Mar., 1906 | ,, | 10 21 | 251,883 | 174,936 | 76,947 | 172,476 | 16,806 | 150,228 | 30,818 | 20,838 | 33,654 | 498 | 34,152 |
| Staly'ge, H.,M.,D. | †Mar. 31, 1913 | May, 1904 | ,, | 27 57 | 325,270 | 274,990 | 44,280 | 279,778 | 10,096 | 224,700 | 56,290 | 500 | 34,961 | 677 | 35,638 |
| Stockport ... | Mar. 31, 1912 | Aug., 1902 | ,, | 27 50 | 305,028 | 234,500 | 70,528 | 238,199 | 8,623 | 176,002 | 58,498 | 54,219 | 59,594 | 1,245 | 60,839 |
| Sunderland ... | †Mar. 31, 1913 | Aug., 1900 | ,, | 20 28 | 308,699 | 303,211 | 5,488 | 305,234 | 14,999 | 182,318 | 111,943 | 31,883 | 68,507 | 364 | 68,871 |
| Wallasey ... | †Mar. 31, 1913 | Mar., 1902 | ,, | 19 69 | 198,167 | 195,290 | 2,877 | 215,424 | 10,846 | 167,924 | 58,733 | 11,927 | 57,458 | 564 | 58,022 |
| Walsall ... ... | †Dec. 31, 1912 | Dec., 1902 | ,, | 19 44 | 188,145 | 188,100 | 45 | 183,351 | 9,378 | 156,161 | 31,939 | 30,879 | 30,629 | 800 | 31,429 |
| Walthamstow ... | Mar. 31, 1912 | June, 1905 | ,, | 12 42 | 180,000 | 180,000 | Nil | 173,081 | 13,846 | 163,679 | 16,321 | 2,757 | 38,249 | 741 | 38,990 |
| Warrington ... | †Mar. 31, 1913 | April, 1902 | ,, | 9 52 | 103,674 | 102,896 | 778 | 102,128 | 10,583 | 73,830 | 29,068 | 10,000 | 22,903 | 302 | 23,205 |
| West Ham ... | †Mar. 31, 1913 | Feb., 1904 | ,, | 30 4 | 563,478 | 551,463 | 12,015 | 556,878 | 18,532 | 539,650 | 90,402 | 40,352 | 137,766 | 676 | 138,442 |
| Wigan ... ... | †Mar. 31, 1913 | April, 1901 | ,, | (k) 34 42 | ... | ... | ... | ... | ... | ... | ... | ... | 71,268 | 1,515 | 72,783 |
| Wolverhampton | †Mar. 31, 1913 | April, 1902 | S. | 21 40 | 279,733 | 265,616 | 14,117 | 278,615 | 12,959 | 217,882 | 47,734 | 50,220 | 53,963 | 797 | 54,760 |
| Yarmouth (Gt.)... | †Mar. 31, 1913 | June, 1902 | E. | 14 32 | 144,500 | 119,750 | 24,750 | 121,899 | 8,465 | 111,450 | 22,737 | 6,070 | 23,625 | 508 | 24,133 |

## TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | †Mar. 31, 1913 | Nov., 1905 | E. | 98 54 | 1,567,674 | 1,386,232 | 181,442 | 1,389,713 | 14,037 | 1,381,200 | 144,342 | 117,769 | 250,589 | 3,788 | 254,377 |
| Bexley ... ... | Mar. 31, 1912 | Oct., 1903 | ,, | 6 42 | 99,942 | 96,984 | 2,958 | 96,924 | 14,854 | 78,800 | 18,184 | (j) 1,074 | 13,826 | 1,542 | 15,368 |
| Birkenhead | †Mar. 31, 1913 | Feb., 1901 | ,, | 24 7 | 375,848 | 364,854 | 10,994 | 366,610 | 15,220 | 247,012 | 117,863 | 18,070 | 61,202 | 4,365 | 65,567 |
| Bournemouth ... | †Mar. 31, 1913 | July, 1902 | ,, | (e) 29 62 | 449,027 | ... | ... | 435,788 | 19,500 | 221,797 | 134,815 | 13,733 | 95,695 | 317 | 96,012 |
| Cardiff ... ... | Mar. 31, 1912 | May, 1902 | ,, | 31 66 | 813,923 | 787,292 | 26,631 | 783,051 | 24,683 | 583,869 | 203,422 | 86,411 | 125,743 | 19,181 | 144,924 |
| Coventry ... | †Mar. 31, 1913 | Jan., 1912 | ,, | 15 40 | 220,538 | 216,436 | 4,102 | 211,298 | 13,632 | 216,436 | 3,287 | 2,876 | 38,996 | 157 | 39,153 |
| Glasgow ... ... | †May 31, 1913 | Oct., 1898 | ,, | 193 47 (b) 2 52 | 3,714,266 | 3,553,584 | 160,682 | 3,694,143 | 18,595 | 2,479,408 | 1,074,177 | 2,079,645 | 1,007,653 | 3,891 | 1,011,544 |
| Huddersfield ... | †Mar. 31, 1913 | Feb., 1901 | ,, | 46 0 | 646,284 | 407,142 | 239,142 | 417,408 | 9,074 | 255,177 | 161,349 | 19,132 | 106,586 | 3,123 | 109,709 |
| Hull ... ... | †Mar. 31, 1913 | July, 1899 | ,, | 30 44 | 677,673 | 541,871 | 135,802 | 542,371 | 17,753 | 527,641 | 147,925 | 125,407 | 157,048 | 1,393 | 158,441 |
| Leeds ... ... | †Mar. 31, 1913 | Aug., 1897 | ,, | 112 62 | 1,603,455 | 1,546,422 | 57,033 | 1,511,588 | 13,406 | 1,220,041 | 482,698 | 4,637 | 407,552 | 3,979 | 411,531 |
| Leicester... ... | †Dec. 31, 1912 | May, 1904 | ,, | 37 0 | 739,240 | 719,223 | 20,017 | 722,021 | 19,514 | 607,476 | 129,211 | 100,000 | 134,966 | 12,705 | 147,671 |
| London ... ... | Mar. 31, 1912 | ... | H. | 23 30 | | | | | | ... | ... | ... | 60,357 | 1,335 | 61,692 |
| | | May, 1903 | C.E. | 255 60 | (c) | (c) | (c) | 11,850,127 | ... | 11,309,789 | 2,423,040 | 920,402 | 2,231,902 | 62,587 | 2,294,489 |
| N'castle-on-Tyne | †Mar. 31, 1913 | Dec., 1901 | E. | 61 0 | 1,522,010 | 1,251,047 | 270,963 | 1,234,080 | 20,230 | 939,120 | 383,921 | 119,407 | 228,091 | 10,114 | 238,205 |
| Northampton ... | †Mar. 31, 1913 | July, 1904 | ,, | 9 13 | 239,800 | 127,255 | 112,545 | 135,481 | 14,786 | 91,176 | 36,078 | 10,499 | 27,250 | 899 | 28,149 |
| Portsmouth ... | †Mar 31, 1913 | Sep.. 1901 | ,, | 30 66 | 662,280 | 698,319 | ... | 712,792 | 23,118 | 647,489 | 234,258 | 94,934 | 108,087 | 1,745 | 109,832 |
| Preston ... ... | †Mar. 31, 1913 | June, 1904 | ,, | 17 16 | 224,102 | 187,270 | 36,832 | 187,269 | 10,888 | 119,790 | 42,091 | 36,841 | 42,964 | 306 | 43,270 |
| Reading ... ... | †Mar. 31, 1913 | July, 1903 | ,, | 13 14 | 235,000 | 234,000 | 1,000 | 229,372 | 17,409 | 169,642 | 59,896 | 17,831 | 32,984 | 1,030 | 34,014 |
| Sheffield ... ... | †Mar. 25, 1913 | Sep.. 1899 | ,, | 77 67 | 1,727,596 | 1,413,980 | 313,616 | 1,411,959 | 18,140 | 1,067,897 | 418,292 | 27,521 | 358,656 | 3,189 | 361,845 |
| Wellington, N.Z. | †Mar. 31, 1913 | ... | ,, | 30 7 | 496,423 | 496,423 | Nil | 606,771 | 20,165 | 496,423 | 39,486 | 109,066 | 149,446 | 826 | 150,272 |

C = Electric conduit system. E = Electric trolley system. H = Horse lines. S = Surface contact system. (a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed. (d) Car depot extensions. (e) Includes 7 mi. 34·53 chs. single track lines leased. (f) Unlimited. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased. (j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance.
† Reports inserted for the financial year 1912-13.



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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Working Expenses. | | | | | Gross Profit on Working. | Additions to Gross Profit | Deductions from Gross Profit. | | | | | | Net Surplus + or Deficit − |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traffic. | General. | Repairs & Maintenance. | Power. | Total. | | | Interest. | Sinking Fund. | Income Tax. | Depreciation & Renewal | Sundries. | Total. | |
| Aberdeen | 20,710 | 9,404 | 5,954 | 7,138 | 43,206 | 36,960 | 472 | 6,839 | 4,661 | ... | 13,407 | ... | 24,907 | + 12,525 |
| Accrington | 6,839 | 1,870 | 2,102 | 4,644 | 15,455 | 12,367 | ... | 4,000 | 3,693 | 127 | ... | ... | 7,820 | + 4,553 |
| Ashton-und'r-Lyne | 4,699 | 1,964 | 2,358 | 3,225 | 11,997 | 9,894 | ... | 2,814 | 3,536 | 440 | 750 | †1,004 | 8,544 | + 1,350 |
| Ayr | 3,486 | 1,964 | 1,604 | 1,989 | 9,043 | 7,253 | ... | 1,972 | 1,943 | 122 | 2,041 | ... | 6,078 | + 1,175 |
| Birmingham | 160,277 | 40,898 | 68,278 | 100,726 | 370,179 | 211,387 | 11,479 | 65,672 | 49,946 | ... | ... | 5,896 | 121,514 | +101,352 |
| Blackburn | 14,863 | 4,262 | 12,392 | 10,999 | 42,516 | 24,167 | 110 | 5,292 | 14,909 | 206 | ... | ... | 20,407 | + 3,870 |
| Blackpool | 15,992 | 5,132 | 9,286 | 9,272 | 39,682 | 34,484 | ... | (h)9,184 | 6,969 | ... | 8,000 | ... | 24,153 | + 10,331 |
| Bolton | 29,821 | 8,646 | 15,984 | 19,767 | 74,213 | 62,244 | 1,114 | (h)11,189 | 17,197 | 1,095 | 18,715 | 219 | 48,415 | + 14,943 |
| Bradford | 83,763 | 24,458 | 46,061 | 46,271 | 200,553 | 98,550 | 4,045 | 20,735 | 31,926 | 3,653 | 32,921 | 4,360 | 93,595 | + 9,000 |
| Brighton | 14,309 | 4,028 | 12,853 | 8,316 | 39,506 | 14,292 | 27 | 7,800 | 5,560 | ... | 27 | ... | 13,360 | + 932 |
| Burnley | 18,718 | 5,306 | 9,525 | 15,881 | 49,430 | 30,460 | ... | 5,662 | 6,491 | 893 | ... | (f)2,873 | 15,919 | + 14,541 |
| Burton-on-Trent | 5,111 | 1,322 | 2,903 | 2,998 | 12,334 | 3,353 | ... | 1,406 | 1,418 | ... | 1,500 | ... | 4,324 | − 971 |
| Bury | 14,761 | 4,349 | 6,633 | 8,026 | 33,769 | 33,885 | 337 | (h)7,974 | 4,824 | 244 | ... | (te)11,608 | 24,650 | + 9,572 |
| Chester | 3,349 | 1,574 | 878 | 2,203 | 8,004 | 4,726 | 93 | (h)2,761 | 1,018 | ... | 1,040 | ... | 4,819 | ... |
| Chesterfield | 2,712 | 1,166 | 1,469 | 2,019 | 7,366 | 4,839 | 219 | 2,426 | 1,799 | ... | ... | ... | 4,225 | + 833 |
| Colchester | 2,825 | 1,189 | 1,771 | 2,508 | 8,293 | 2,465 | 48 | (h) 2,159 | 2,319 | ... | ... | ... | 4,478 | − 1,985 |
| Croydon | 29,571 | 6,806 | 13,300 | 16,541 | 66,218 | 26,246 | 907 | 7,994 | 7,428 | 1,145 | ... | ... | 16,567 | + 10,586 |
| Darlington | 4,192 | 754 | 1,912 | 1,945 | 8,811 | 3,365 | 102 | 2,010 | 1,966 | 105 | 404 | 59 | 4,544 | − 1,077 |
| Darwen | 3,594 | 831 | 3,096 | 2,395 | 9,916 | 5,504 | 141 | 2,298 | 2,191 | ... | 1,050 | ... | 5,539 | + 166 |
| Derby | E 16,388<br>H 631 | 2,621<br>... | 4,768<br>73 | 8,200<br>... | 31,977<br>704 | 15,873<br>def. 288 | 547 | 6,388 | 3,363 | ... | 310 | (l) 300 | 10,361 | + 6,060 |
| Doncaster | 4,364 | 1,156 | 4,698 | 3,561 | 13,779 | 6,483 | 84 | 2,876 | 1,737 | ... | 664 | ... | 5,277 | + 1,290 |
| Dundee | 16,477 | 5,607 | 7,122 | 10,216 | 39,422 | 25,623 | ... | 8,606 | 6,020 | 233 | 9,254 | ... | 24,113 | + 1,510 |
| East Ham | 17,280 | 6,330 | 11,722 | 10,072 | 45,404 | 12,256 | ... | (h) 5,806 | 6,725 | ... | ... | 454 | 12,985 | − 729 |
| Exeter | 4,511 | 1,175 | 1,311 | 3,499 | 10,496 | 6,252 | ... | (h) 2,347 | 1,814 | 48 | ... | ... | 4,209 | + 2,043 |
| Gloucester | 6,891 | 1,687 | 3,290 | 1,914 | 13,782 | 3,563 | ... | (h)4,502 | 2,772 | ... | 750 | ... | 8,024 | − 4,461 |
| Halifax | 27,116 | 8,306 | 15,263 | 18,976 | 69,661 | 36,312 | 51 | 10,159 | 10,562 | ... | 6,701 | 1,760 | 29,182 | + 7,181 |
| Ilford | 9,482 | 2,424 | 4,116 | 4,279 | 20,301 | 6,467 | 557 | 4,894 | 4,146 | ... | ... | ... | 9,040 | − 2,016 |
| Ilkeston | 2,359 | 579 | 1,613 | 1,476 | 6,027 | 662 | 157 | 1,578 | 1,644 | ... | ... | 210 | 3,432 | − 2,613 |
| Ipswich | 8,072 | 1,827 | 4,015 | 3,502 | 17,416 | 5,988 | ... | (h)3,642 | 2,078 | ... | ... | ... | 5,720 | + 268 |
| Keighley | 2,769 | 724 | 940 | 1,551 | 5,984 | 3,855 | 224 | 1,160 | 1,815 | ... | ... | (m) 1,104 | 4,079 | ... |
| Kilmarnock | 2,921 | 599 | 800 | 1,633 | 5,953 | 2,838 | ... | (h)1,623 | 1,233 | 3 | 1,160 | 28 | 4,047 | − 1,209 |
| Kirkcaldy | 4,728 | 1,158 | 1,525 | 2,636 | 10,047 | 6,159 | ... | 2,660 | 1,608 | ... | 410 | 110 | 4,788 | + 1,370 |
| Lancaster | 2,237 | 474 | 872 | 1,621 | 5,204 | 376 | 80 | 1,243 | 1,467 | ... | ... | ... | 2,710 | − 2,254 |
| Leith | 9,057 | 2,439 | 3,588 | 3,147 | 18,231 | 16,452 | 86 | (h)6,566 | 7,750 | ... | ... | 139 | 14,455 | + 2,093 |
| Leyton | (p)16,573 | 5,056 | 8,211 | 11,672 | 41,512 | 21,156 | ... | 10,340 | 7,596 | ... | 1,478 | 264 | 19,678 | + 1,478 |
| Lincoln | 1,478 | 625 | 989 | 925 | 4,017 | 2,828 | 153 | 1,529 | 1,071 | ... | ... | ... | 2,600 | + 381 |
| Liverpool | 167,045 | 58,771 | 80,184 | 113,893 | 419,893 | 224,281 | 24,045 | 50,096 | 59,155 | ... | (d)66,929 | (e) 5,217 | 181,397 | + 66,929 |
| Lowestoft | 3,285 | 796 | 2,115 | 2,813 | 9,009 | 1,789 | .. | (h) 2,261 | 1,562 | ... | ... | 350 | 4,173 | − 2,384 |
| Maidstone | 2,324 | 1,077 | 1,139 | 1,868 | 6,408 | 3,369 | 58 | (h) 2,797 | 2,185 | ... | ... | 74 | 5,056 | − 1,609 |
| Manchester | 255,604 | 83,574 | 84,879 | 133,681 | 557,738 | 329,909 | 14,282 | 55,771 | 52,394 | 8,613 | 96,351 | (e)31,062 | 244,191 | +100,000 |
| Nelson | 2,425 | 677 | 1,320 | 2,006 | 6,428 | 3,863 | ... | 1,008 | 966 | ... | ... | ... | 1,974 | + 1,899 |
| Newport (Mon.) | 10,254 | 4,009 | 10,364 | 7,044 | 31,671 | 6,879 | 808 | 5,817 | 4,197 | ... | ... | ... | 10,014 | − 2,327 |
| Nottingham | 43,601 | 15,142 | 18,684 | 30,847 | 108,274 | 58,886 | ... | 14,349 | 19,762 | ... | ... | ... | 34,111 | + 24,775 |
| Oldham | 25,759 | 7,792 | 18,416 | 21,470 | 73,437 | 37,140 | 1,474 | 15,796 | 11,822 | 1,099 | ... | (g) 7,762 | 36,479 | + 2,135 |
| Perth | 3,795 | 680 | 450 | 1,347 | 6,272 | 3,829 | 45 | 2,332 | 2,006 | 2 | 640 | 51 | 5,031 | − 1,157 |
| Plymouth | 7,933 | 3,542 | 5,029 | 7,577 | 24,081 | 13,832 | 1,258 | 4,778 | 3,931 | ... | 3,354 | ... | 12,063 | + 3,027 |
| Pontypridd | 5,307 | 1,469 | 6,611 | 3,656 | 17,043 | 6,123 | 5 | (h)4,293 | 4,034 | ... | 590 | 41 | 8,958 | − 2,830 |
| Rawtenstall | 5,292 | 2,216 | 2,049 | 3,958 | 13,515 | 11,566 | (q)1,663 | 6,148 | 5,531 | ... | ... | ... | 11,679 | + 1,550 |
| Rochdale | 16,421 | 4,475 | 6,944 | 9,527 | 37,367 | 35,635 | 246 | 11,380 | 9,594 | 694 | ... | (z)7,727 | 29,395 | + 6,486 |
| Rotherham | 8,991 | 2,539 | 5,187 | 8,497 | 25,214 | 10,643 | 944 | 4,393 | 2,757 | ... | 3,707 | ... | 10,857 | + 786 |
| Salford | 73,745 | 17,785 | 22,183 | 47,371 | 161,084 | 99,767 | 5,659 | 18,749 | 21,887 | 2,522 | 12,867 | (k)27,401 | 83,426 | + 22,069 |
| Southampton | 17,703 | 4,879 | 8,782 | 12,454 | 43,818 | 22,291 | 6,099 | 6,779 | 6,578 | 574 | ... | 488 | 14,419 | + 13,971 |
| Southend-on-Sea | 8,046 | 2,260 | 3,534 | 6,187 | 20,027 | 14,891 | 4,228 | (h 3,834 | 1,753 | ... | 4,017 | ... | 9,605 | + 9,514 |
| Southport | 4,836 | 2,004 | 2,801 | 3,470 | 13,111 | 5,933 | 6,370 | 11,525 | ... | ... | 2,738 | ... | 14,263 | − 1,960 |
| South Shields | 7,929 | 3,263 | 2,659 | 5,370 | 19,221 | 14,931 | 313 | (h)5,488 | 3,438 | ... | ... | ... | 8,926 | + 6,318 |
| Staly'dge,H.,M.,D. | 12,148 | 4,018 | 6,273 | 6,445 | 28,884 | 6,754 | ... | (h)7,711 | 7,308 | ... | 327 | 532 | 15,878 | − 9,124 |
| Stockport | 12,436 | 3,717 | 6,437 | 4,781 | 27,371 | 33,468 | 1,326 | 5,978 | 8,363 | 910 | 6,795 | 3,208 | 25,254 | + 9,540 |
| Sunderland | 18,451 | 4,552 | 4,670 | 11,268 | 38,921 | 29,950 | 252 | (h) 7,228 | 10,366 | 476 | 7,132 | ... | 25,202 | + 5,000 |
| Wallasey | 17,249 | 4,326 | 5,695 | 10,660 | 37,930 | 20,092 | 316 | 5,522 | 4,559 | ... | 634 | ... | 10,715 | + 9,693 |
| Walsall | 7,155 | 3,034 | 4,126 | 3,913 | 18,228 | 13,201 | 1,334 | 5,164 | 3,577 | 415 | 368 | 1,119 | 10,643 | + 3,892 |
| Walthamstow | 13,413 | 2,547 | 5,204 | 7,423 | 28,587 | 10,403 | 210 | (h)6,214 | 2,599 | ... | ... | ... | 8,813 | + 1,800 |
| Warrington | 5,529 | 1,779 | 4,255 | 3,235 | 14,798 | 8,407 | 408 | 2,580 | 3,254 | ... | ... | ... | 5,834 | + 2,981 |
| West Ham | 51,254 | 11,253 | 26,921 | 19,386 | 108,814 | 29,628 | 508 | 19,511 | 12,369 | 685 | ... | 959 | 33,524 | — 3,388 |
| Wigan | ... | ... | ... | ... | 41,318 | 31,465 | ... | 13,859 | 12,391 | ... | ... | 3,781 | ... | ... |
| Wolverhampton | 12,259 | 4,157 | 7,334 | 6,778 | 30,528 | 24,232 | (x) 1,131 | 7,788 | 5,146 | 100 | 4,915 | (a)3,637 | 21,586 | + 8,777 |
| Yarmouth (Gt.) | 7,443 | 1,867 | 2,634 | 4,388 | 16,332 | 7,801 | 95 | (h) 4,094 | 2,740 | ... | ... | ... | 6,834 | + 1,062 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | 73,836 | 13,642 | 32,519 | 23,887 | 143,884 | 110,492 | 1,363 | 45,900 | 24,541 | 2,023 | 13,000 | 1,628 | 87,092 | + 24,763 |
| Bexley | (s) 5,465 | 984 | 1,892 | 920 | 9,261 | 6,107 | ... | 2,942 | 2,325 | ... | 500 | ... | 5,767 | + 340 |
| Birkenhead | 16,099 | 4,011 | 10,380 | 9,371 | 39,861 | 25,706 | 86 | (h)11,537 | 9,501 | 269 | 4,302 | 183 | 25,792 | ... |
| Bournemouth | 22,307 | 6,912 | 9,107 | 13,967 | 52,293 | 43,719 | 723 | 10,733 | 15,371 | ... | ... | (c) 8,017 | 34,121 | + 10,321 |
| Cardiff | 37,145 | (c)10,512 | 14,894 | 17,223 | 79,774 | 65,150 | 1,529 | 24,327 | 23,079 | 750 | 6,947 | ... | 55,103 | + 11,576 |
| Coventry | 10,112 | 4,289 | 6,952 | 2,765 | 24,118 | 15,035 | 2,950 | 10,379 | 6,163 | ... | 1,258 | ... | 17,800 | + 185 |
| Glasgow | 305,400 | 122,812 | 142,988 | 48,147 | 619,347 | 392,197 | 58,631 | 81,774 | 97,077 | 13,388 | 215,757 | 9,829 | 417,825 | + 33,003 |
| Huddersfield | 26,892 | 6,064 | 22,638 | 9,933 | 65,527 | 44,182 | 61 | (h)11,749 | 10,904 | 1,630 | ... | ... | 24,283 | + 19,960 |
| Hull | 47,495 | 12,212 | 42,005 | 11,245 | 112,957 | 45,484 | 1,500 | 16,730 | 12,201 | 1,500 | (u)3,118 | ... | 33,549 | + 13,435 |
| Leeds | 109,413 | 36,055 | 39,894 | 28,455 | 213,817 | 197,714 | 7,511 | 42,197 | 49,923 | 5,021 | 41,752 | 4,957 | 143,850 | + 61,375 |
| Leicester | 47,876 | 9,497 | 22,023 | 15,633 | 95,029 | 52,642 | 2,512 | 23,252 | 12,095 | 1,939 | 7,668 | ... | 44,954 | + 10,000 |
| London | H 28,811<br>E 696,620 | 4,371<br>(r) 188,382 | 7,782<br>295,669 | (m)32,694<br>167,639 | 73,658<br>1,348,310 | def.11,966<br>946,179 | 29,440 | 334,173 | 369,356 | 22,858 | 138,152 | (l)26,529 | 891,068 | + 84,551 |
| N'castle on-Tyne | 64,493 | 18,675 | 25,944 | 19,908 | 129,020 | 109,185 | 3,966 | 30,431 | 39,556 | 3,179 | ... | 6,796 | 79,962 | + 33,189 |
| Northampton | 7,254 | 3,080 | 2,489 | 3,563 | 16,386 | 11,763 | 279 | 3,481 | 4,312 | 323 | ... | (b)1,226 | 9,342 | + 2,700 |
| Portsmouth | 28,918 | 10,200 | 7,877 | 5,231 | 52,226 | 57,606 | 8,831 | 20,875 | 17,462 | 964 | 8,412 | 350 | 48,063 | + 18,374 |
| Preston | 10,781 | 4,592 | 6,263 | 2,429 | 24,065 | 19,205 | ... | 3,933 | 4,891 | ... | 3,649 | 1,358 | 13,831 | + 5,374 |
| Reading | 8,837 | 3,702 | 3,648 | 3,358 | 19,545 | 14,469 | ... | 6,714 | 4,662 | 291 | ... | ... | 11,667 | + 2,802 |
| Sheffield | 113,235 | 22,312 | 43,656 | 28,487 | 207,690 | 154,155 | 3,057 | 35,616 | 40,663 | 3,786 | 30,187 | 213 | 110,465 | + 46,748 |
| Wellington, N.Z. | 56,296 | 7,242 | 21,330 | 16,260 | 101,128 | 49,144 | 2,664 | 19,961 | 4,778 | ... | 14,068 | 4,702 | 43,509 | + 8,299 |

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £243 horse account. (q) Aid from rates £1,500. (r) Including special charges, £17,478. (s) Including £2,128 through-running expenses.
(u) District fund widening streets. (te) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £4,386 rent of leased lines. † This item includes £734 payable to Sinking Fund of Hurst U.D.C.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Appropriation of Net Surplus. | | | Receipts per Car Mile. | | Operating Expenses per Car Mile. | | | | | Percentage of Operating Expenses to Total Revenue. % | Average Operating Expenses per Car Mile (excludi'g Power Cost). d. | Board of Trade Units. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carried Forward. | Reserve. | Contribution to Rates or Municip'l Funds. | Average Total per Car Mile. d. | Average Traffic per Car Mile. d. | Traffic. d. | General. d. | Repairs and Maintenance. d. | Power. (Price paid) d. | Total. d. | | | Units. | Cost per Unit. d. | Units used per car mile. |
| Aberdeen ... | ... | 12,525 | ... | 11·06 | 10·92 | 2·859 | 1·298 | ·822 | ·985 | 5·964 | 53·89 | 4·979 | 2,110,964 | ·81 | 1·21 |
| Accrington ... | 460 | 3,359 | 724 | 12·57 | 12·38 | 3·09 | ·84 | ·95 | 2·10 | 6·98 | 55·55 | 4·88 | 907,721 | 1·24 | 1·70 |
| Ashton-u-Lyne | ... | ... | 1,350 | 11·475 | 11·186 | 2·463 | ·899 | 1·236 | 1·691 | 6·289 | 54·801 | 4·598 | 619,289 | 1·25 | 1·353 |
| Ayr... ... ... | ... | 1,175 | ... | 10·13 | 9·713 | 2·16 | 1·23 | ·99 | 1·24 | 5·62 | 55 | 4·35 | 378,570 | 1·26 | ·98 |
| Birmingham ... | ... | 45,000 | 56,352 | 10·62 | 10·492 | 2·929 | ·747 | 1·248 | 1·840 | 6·764 | 63·6 | 4·924 | 21,594,889 | 1·119 | 1·64 |
| Blackburn ... | 3,870 | ... | ... | 14·02 | 13·34 | 3·12 | ·90 | 2·61 | 2·31 | 8·94 | 56·84 | 6·63 | 2,030,535 | 1·3 | 1·81 |
| Blackpool ... | ... | 2,667 | 7,664 | 16·93 | 16·71 | 3·64 | 1·17 | 2·12 | 2·12 | 9·05 | 53·50 | 6·95 | 1,400,209 | 1·587 | 1·33 |
| Bolton ... ... | 443 | ... | 14,500 | 11·558 | 11·447 | 2·525 | ·733 | 1·354 | 1·674 | 6·286 | 54·915 | 4·612 | 4,315,448 | 1·1 | 1·52 |
| Bradford ... ... | ... | ... | 9,000 | 12·021 | 11·314 | 3·366 | ·983 | 1·859 | 1·860 | 8·068 | 67·051 | 5·687 | 11,126,989 | 1 | 1·863 |
| Brighton ... ... | 932 | ... | ... | 11·545 | 11·112 | 3·071 | ·864 | 2·758 | 1·785 | 8·478 | 73·43 | 6·693 | 1,663,126 | 1·2 | 1·49 |
| Burnley ... ... | ... | 5,791 | 8,750 | 13·226 | 13·185 | 3·098 | ·878 | 1·577 | 2·630 | 8·183 | 61·85 | 5·55 | 3,079,155 | 1·214 | 2·11 |
| Burton-on-Trent | ... | ... | ... | 8·61 | 7·90 | 2·81 | ·73 | 1·45 | 1·42 | 6·41 | 78·7 | 4·99 | 515,622 | 1·39 | 1·01 |
| Bury ... ... | ... | (i) 4,572 | 5,000 | 10·22 | 10·04 | 2·214 | ·685 | 1·152 | 1·290 | 5·341 | 49·91 | 4·051 | 2,039,011 | 1·081 | 1·271 |
| Chester ... ... | ... | ... | ... | 8·81 | 8·50 | 2·32 | 1·09 | ·61 | 1·52 | 5·54 | 63 | 4·02 | 385,132 | 1·33 | 1·11 |
| Chesterfield ... | ... | 833 | ... | 10·10 | 9·69 | 2·24 | ·96 | 1·22 | 1·68 | 6·1 | 59·6 | 4·43 | 387,704 | 1·25 | 1·3 |
| Colchester ... | ... | ... | ... | 7·98 | 7·627 | 2·096 | ·882 | 1·313 | 1·86 | 6·151 | 76·74 | 4·291 | 401,208 | 1·5 | 1·24 |
| Croydon ... ... | ... | 7,586 | 3,000 | 8·381 | 8·207 | 2·763 | ·637 | 1·224 | 1·499 | 6·123 | 70·91 | 4·497 | 2,484,993 | 1·604 | ·938 |
| Darlington ... | ... | ... | ... | 7·651 | 7·441 | 2·633 | ·480 | 1·202 | 1·222 | 5·537 | 72·36 | 4·315 | 466,784 | 1 | 1·222 |
| Darwen ... ... | 106 | ... | ... | 14·218 | 14·204 | 3·771 | ·783 | 2·833 | 2·396 | 9·783 | 64·30 | 7·387 | ... | ... | ... |
| Derby ... ... | 6,059 | ... | ... | E 9·884<br>H. 5·649 | 9·671<br>5·347 | 3·385<br>8·564 | ·541<br>... | ·985<br>·994 | 1·694<br>... | 6·605<br>9·558 | 66·8<br>169·4 | 4·911<br>... | 1,357,232<br>... | 1·45<br>... | 1·168<br>... |
| Doncaster ... | ... | 1,290 | ... | 9·41 | 9·25 | 2·03 | ·54 | 2·18 | 1·65 | 6·40 | 69·1 | 4·75 | 683,651 | 1·25 | 1·32 |
| Dundee ... ... | ... | 10 | 1,500 | 11·480 | 11·189 | 2·908 | ·989 | 1·257 | 1·803 | 6·957 | 60·6 | 5·154 | 2,451,897 | 1 | 1·803 |
| East Ham ... | ... | ... | ... | 10·06 | 9·95 | 3·02 | 1·10 | 2·04 | 1·76 | 7·92 | 78·8 | 6·16 | 2,139,401 | 1·125 | 1·55 |
| Exeter ... ... | ... | 2,043 | ... | 9·272 | 9·272 | 2·498 | ·650 | ·726 | 1·937 | 5·811 | 62·67 | 3·874 | 516,793 | 1·625 | 1·192 |
| Gloucester ... | ... | ... | ... | 6·618 | 6·173 | 2·630 | ·644 | 1·255 | ·730 | 5·259 | 79 | 4·529 | 480,442 | 1 | ·73 |
| Halifax ... ... | ... | ... | 7,181 | 11·816 | 11·702 | 3·023 | ·926 | 1·702 | 2·116 | 7·767 | 65 | 5·65 | 3,900,902 | 1·125 | 1·81 |
| Ilford ... ... | ... | ... | ... | 7·616 | 7·464 | 2·698 | ·689 | 1·171 | 1·218 | 5·776 | 76·4 | 4·558 | 960,866 | 1·07 | 1·098 |
| Ilkeston ... ... | ... | ... | ... | 6·73 | 6·57 | 2·36 | ·58 | 1·63 | 1·49 | 6·06 | 90·25 | 4·57 | 339,920 | 1·042 | 1·4 |
| Ipswich ... ... | 268 | ... | ... | 8·408 | 8·110 | 2·900 | ·657 | 1·442 | 1·258 | 6·257 | 74·41 | 4·999 | 672,411 | 1·25 | 1·007 |
| Keighley ... ... | ... | ... | ... | 9·721 | 9·473 | 2·736 | ·715 | ·929 | 1·532 | 5·912 | 61 | 4·380 | 248,096 | 1·5 | 1·021 |
| Kilmarnock ... | ... | ... | ... | 7·09 | 6·89 | 2·357 | ·482 | ·646 | 1·317 | 4·802 | 66·3 | 3·487 | 313,550 | 1·25 | 1·06 |
| Kirkcaldy ... | 1,370 | ... | ... | 8·22 | 7·97 | 2·398 | ·587 | ·774 | 1·337 | 5·096 | 63·95 | 3·75 | 632,581 | 1 | 1·337 |
| Lancaster ... | ... | ... | ... | 7·92 | 7·61 | 3·130 | ·664 | 1·221 | 2·269 | 7·284 | 91 | 5·015 | 228,902 | 1·7 | 1·33 |
| Leith ... ... | 2,093 | ... | ... | 8·72 | 8·51 | 2·28 | ·61 | ·91 | ·78 | 4·58 | 52·54 | 3·8 | 863,202 | ·875 | ·9 |
| Leyton ... ... | 1,478 | ... | ... | 10·365 | 10·142 | (c) 3·143 | ·964 | 1·417 | 1·711 | 7·235 | 66·241 | 5·524 | 2,542,672 | 1·078 | 1·587 |
| Lincoln ... ... | 381 | ... | ... | 10·24 | 10·05 | 2·21 | ·94 | 1·47 | 1·38 | 6·00 | 58·7 | 4·62 | 183,807 | 1·25 | 1·107 |
| Liverpool ... | ... | ... | 66,929 | 12·03 | 12·28 | 3·184 | 1·120 | 1·529 | 2·171 | 8·004 | 63·6 | 5·833 | ... | ... | ... |
| Lowestoft ... | ... | ... | ... | 8·3 | 8·3 | 2·5 | ·6 | 1·6 | 2·18 | 6·9 | 83·40 | 4·8 | 385,731 | 1·75 | 1·2 |
| Maidstone ... | ... | ... | ... | 8·19 | 7·77 | 1·942 | ·900 | ·952 | 1·55 | 5·344 | 69 | 3·79 | 358,616 | 1·25 | 1·25 |
| Manchester ... | ... | ... | 100,000 | 11·351 | 11·202 | 3·269 | 1·069 | 1·085 | 1·709 | 7·132 | 62·83 | 5·423 | 30,492,127 | 1·046 | 1·625 |
| Nelson ... ... | 1,889 | ... | ... | 12·29 | 12·23 | 2·89 | ·81 | 1·58 | 2·39 | 7·67 | 62 | 5·28 | 240,804 | 2 | 1·2 |
| Newport (Mon.)... | ... | ... | ... | 9·557 | 9·310 | 2·542 | ·994 | 1·570 | 1·746 | 7·852 | 82·26 | 6·106 | 1,239,245 | 1·28 | 1·28 |
| Nottingham ... | ... | 5,775 | 19,000 | 11·50 | 11·34 | 3·00 | 1·05 | 1·29 | 2·11 | 7·45 | 64·19 | 5·39 | 5,761,096 | 1·25 | 1·65 |
| Oldham ... ... | ... | 2,135 | ... | 12·946 | 12·645 | 3·016 | ·912 | 2·156 | 2·514 | 8·598 | 66·41 | 6·084 | 3,435,211 | 1·49 | 1·675 |
| Perth ... ... | ... | ... | ... | 8·88 | 8·46 | 3·59 | ·64 | ·43 | 1·27 | 5·93 | 59 | 4·04 | 289,473 | 1·083 | 1·17 |
| Plymouth ... | ... | ... | 3,027 | 11·253 | 11·007 | 2·346 | 1·041 | 1·488 | 2·247 | 7·122 | 63·52 | 4·875 | 1,087,297 | 1·672 | 1·34 |
| Pontypridd ... | ... | ... | ... | 10·92 | 10·78 | 2·71 | ·75 | 3·37 | 1·87 | 8·70 | 80·65 | 6·83 | 701,941 | 1·25 | 1·49 |
| Rawtenstall ... | ... | 1,550 | ... | 11·16 | 10·71 | 2·35 | ·98 | ·92 | 1·76 | 6·01 | 53·54 | 4·25 | 687,821 | 1·381 | 1·27 |
| Rochdale... ... | 6,486 | ... | ... | 11·020 | 10·966 | 2·479 | ·691 | 1·067 | 1·533 | 5·770 | 51·2 | 4·237 | 2,250,037 | 1·016 | 1·508 |
| Rotherham ... | ... | ... | 750 | 11·950 | 11·906 | 2·996 | ·846 | 1·729 | 2·832 | 8·403 | 70·32 | 5·571 | 1,359,602 | 1·5 | 1·88 |
| Salford ... ... | ... | ... | 22,000 | 10·692 | 10·673 | 3·023 | ·729 | ·909 | 1·942 | 6·603 | 62 | 4·661 | 9,260,898 | 1·227 | 1·600 |
| Southampton ... | 8,971 | ... | 5,000 | 10·672 | 10·307 | 2·857 | ·788 | 1·418 | 2·010 | 7·073 | 66·3 | 5·063 | 1,874,217 | 1·625 | 1·266 |
| Southend-on-Sea | 2,514 | 1,000 | 6,000 | 13·14 | 12·97 | 3·03 | ·85 | 1·33 | 2·33 | 7·54 | 57·35 | 5·21 | 848,538 | 1·75 | 1·33 |
| Southport ... | ... | ... | ... | 9·827 | 9·611 | 2·495 | 1·034 | 1·446 | 1·791 | 6·766 | 70·3 | 4·9 | 545,793 | 1·50 | 1·172 |
| South Shields ... | (d) 500 | 4,218 | 1,600 | 10·066 | 9·919 | 2·253 | ·885 | ·729 | 1·566 | 5·433 | 56·28 | 4·077 | 914,188 | 1·407 | 1·122 |
| Stalybridge, &c. | ... | ... | ... | 7·880 | 7·729 | 2·686 | ·887 | 1·387 | 1·425 | 6·385 | 81·33 | 4·960 | 1,719,696 | ·9 | 1·584 |
| Stockport ... | ... | 540 | 9,000 | 10·434 | 10·221 | 2·133 | ·638 | 1·103 | ·820 | 4·694 | 44·99 | 3·874 | 1,704,943 | 1·036 | 1·218 |
| Sunderland ... | ... | ... | 5,000 | 11·208 | 11·149 | 2·999 | ·741 | ·760 | 1·834 | 6·334 | 56·81 | 4·50 | 1,764,971 | 1·5 | 1·19 |
| Wallasey ... | ... | 2,500 | 7,500 | 11·035 | 10·928 | 3·280 | ·823 | 1·083 | 2·028 | 7·214 | 65·3 | 5·18 | 1,827,115 | 1·4 | 1·48 |
| Walsall ... ... | 3,392 | ... | 500 | 11·326 | 11·038 | 2·578 | 1·094 | 1·487 | 1·410 | 6·569 | 58 | 5·159 | 780,825 | 1·25 | 1·172 |
| Walthamstow ... | 1,800 | ... | ... | 9·31 | 9·13 | 3·20 | ·61 | 1·24 | 1·77 | 6·82 | 73·32 | 5·05 | 1,188,326 | 1·5 | 1·18 |
| Warrington ... | 1,481 | ... | 1,500 | 12·398 | 12·237 | 2·954 | ·950 | 2·273 | 1·728 | 7·906 | 64·611 | 6·177 | 517,587 | 1·50 | 1·152 |
| West Ham ... | ... | ... | ... | 9·43 | 9·329 | 3·554 | ·761 | 1·823 | 1·313 | 7·451 | 78 | 6·038 | 6,103,884 | ·75 | 1·72 |
| Wigan ... ... | ... | ... | ... | 12·05 | 11·80 | ... | ... | ... | ... | 6·84 | 56·77 | 5·09 | 2,132,384 | ... | 1·471 |
| Wolverhampton | ... | ... | 3,777 | 11·250 | 11·086 | 2·518 | ·854 | 1·507 | 1·393 | 6·272 | 55·75 | 4·879 | 1,620,970 | 1 | 1·388 |
| Yarmouth (Gt.)... | 1,062 | ... | ... | 8·605 | 8·425 | 2·655 | ·666 | ·938 | 1·564 | 5·823 | 67·95 | 4·259 | 655,315 | 1·60 | ·974 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | * | | | | | Works Cost. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | ... | ... | 24,763 | 10·27 | 10·12 | 2·98 | ·55 | 1·31 | ·96 | 5·80 | 56·33 | 4·83 | 9,733,420 | ·589 | 1·40 |
| Bexley ... ... | 40 | .. | ... | 12·8 | 12·63 | 3·04 | ·89 | 1·75 | ·87 | 6·55 | 60·3 | 5·68 | 350,103 | ·63 | 1·37 |
| Birkenhead ... | ... | ... | ... | 12·075 | 11·89 | 3·128 | ·779 | 2·016 | 1·141 | 7·064 | 58·49 | 5·923 | 2,490,713 | ·565 | 2·016 |
| Bournemouth ... | ... | 10,321 | ... | 12·24 | 12·20 | 2·85 | ·88 | 1·16 | (b) 1·78 | 6·67 | 54·46 | 4·89 | 2,917,309 | ·583 | 1·55 |
| Cardiff ... ... | 6,926 | ... | 4,650 | 13·45 | 11·65 | 3·446 | ·976 | 1·382 | ·634 | 6·438 | 55 | 5·804 | 3,864,260 | ·415 | 1·49 |
| Coventry ... | 185 | ... | ... | 9·451 | 9·414 | 2·441 | 1·035 | 1·678 | ·668 | 5·822 | 61·6 | 5·154 | 1,533,212 | ·450 | 1·44 |
| Glasgow ... ... | ... | ... | 33,003 | 10·404 | 10·364 | 3·141 | 1·263 | 1·471 | ·495 | 6·370 | 57·88 | 5·875 | 32,280,346 | ·358 | 1·38 |
| Huddersfield ... | ... | 13,370 | 6,590 | 11·04 | 10·73 | 2·70 | ·61 | 2·28 | 1·00 | 6·59 | 59·73 | 5·59 | 5,413,488 | ·42 | 2·27 |
| Hull ... ... | ... | 1,435 | 12,000 | 9·42 | 9·33 | 2·82 | ·68 | 2·46 | ·67 | 6·63 | 71·04 | 5·96 | 4,855,082 | ·67 | 1·31 |
| Leeds ... ... | ... | ... | 61,375 | 11·229 | 11·120 | 2·985 | ·984 | 1·089 | ·776 | 5·834 | 51·95 | 5·058 | 16,461,894 | ·440 | 1·807 |
| Leicester ... ... | ... | ... | 10,000 | 9·675 | 8·843 | 3·137 | ·622 | 1·443 | 1·024 | 6·226 | 64 | 5·202 | 6,558,800 | ·3645 | 1·79 |
| London ... ... | ... | H. 84,551 | ... | H. 8·81<br>E. 11·29 | 8·62<br>10·98 | 4·12<br>3·42 | ·62<br>·93 | 1·11<br>1·45 | 4·67<br>·83 | 10·52<br>6·63 | 119·40<br>58·76 | 10·52<br>5·80 | ...<br>122,307,298 | ...<br>·61 | ...<br>2·51 |
| N'castle-on-Tyne | ... | 21,189 | 12,000 | 11·958 | 11·451 | 3·238 | ·937 | 1·302 | 1·000 | 6·477 | 52·57 | 5·477 | 9,426,563 | ·394 | 1·972 |
| Northampton ... | 500 | 1,200 | 1,000 | 10·55 | 10·21 | 2·72 | 1·15 | ·93 | 1·34 | 6·14 | 58 | 4·80 | 934,009 | ·91 | 1·46 |
| Portsmouth ... | 11,374 | (f) 5,000 | 4,000 | 12·229 | 12·035 | 3·220 | 1·136 | ·877 | ·582 | 5·815 | 47·55 | 5·233 | 2,599,210 | ·543 | 1·206 |
| Preston ... ... | ... | 5,374 | ... | 10·68 | 10·50 | 2·665 | 1·135 | 1·550 | ·600 | 5·95 | 55·63 | 5·35 | 1,516,545 | ·384 | 1·309 |
| Reading ... ... | ... | 2,802 | ... | 8·920 | 8·650 | 2·319 | ·970 | ·957 | ·880 | 5·126 | 57 | 4·246 | 1,033,313 | ·78 | ·99 |
| Sheffield ... ... | ... | 7,032 | 37,716 | 10·760 | 10·665 | 3·367 | ·664 | 1·298 | ·847 | 6·176 | 57·389 | 5·329 | 16,500,208 | ·673 | 1·837 |
| Wellington, N.Z. | 8,299 | ... | ... | 15·654 | 15·568 | 5·864 | ·755 | 2·222 | 1·694 | 10·535 | 67·3 | 8·841 | 4,921,406 | ·80 | 2·13 |

H—Horse lines. E—Electric trolley system. * The figures given under "Power" in Table II. include actual works costs only.
(b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·050d. (d) Accident, insurance, and compensation fund.
(f) Insurance fund. (i) Including Insurance.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Population Served. | Car Mileage. | Passengers Carried. | Traffic Records. Passengers Carried per Car Mile. | Average Fare per Passenger. | Average Journeys per Head of Populat'n per Annum. | Average Car Miles per Day per Car. | Traffic Revenue per Mile of Single Track. | Average Traffic Revenue per Annum per Head of Populat'n Served. | Operating Expenses per Passenger. | Average Distance of 1d. Fare. | Average Fare Charged per Mile. | Average Speed per Hour. | Average Total Car Hours per Day. | Average Number of Cars in Use Daily. | Number of Cars in Stock. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *d* | | | £ | | *d.* | *Miles.* | *d.* | *Miles.* | | | |
| Aberdeen ... | 165,000 | 1,738,966 | 19,990,711 | 11·49 | ·95 | 121·15 | 105·8 | 2,930 | 9/6 | ·519 | 1·69 | ·6 | 7·5 | 655 | 45 | 77 |
| Accrington ... | 70,000 | 531,356 | 4,517,019 | 8·6 | 1·43 | 65·3 | 105 | 2,572 | 7/10 | ·81 | 1·07 | ·929 | 7·5 | 242 | 17 | 27 |
| Ashton-u-L. | 50,000 | 457,856 | 4,754,139 | 10·383 | 1·077 | 95·083 | 104 | 2,606 | 8/6 | ·606 | 1·223 | ·81 | 8 | 204 | 12 | 21 |
| Ayr ... ... | 33,000 | 385,986 | 3,880,850 | 10·05 | ·96 | 117 | 106 | 2,079 | 9 6 | ·558 | 1·25 | ·75 | 8 | 140 | 10 | 20 |
| Birmingham | c.1,850,000 | 13,134,642 | 134,467,166 | 10·23 | 1·025 | 158 | 81·06 | 5,298 | 13/6 | ·66 | 2·34 | ·366 | 7·5 | 10·44 | 485 | 511 |
| Blackburn ... | 200,000 | 1,141,161 | 11,721,367 | 10·88 | 1·27 | 58·61 | 105 | 2,564 | 6/4 | ·87 | 1·25 | ·76 | 7·50 | 434 | 31 | 61 |
| Blackpool ... | 67,500 | 1,050,115 | 12,452,820 | 12 | 1·41 | 184·48 | 89·6 | 4,321 | 21/8 | ·765 | ... | ... | 8 | ... | 32 | 72 |
| Bolton ... | 221,000 | 2,831,003 | 30,287,673 | 10·69 | 1·065 | 137·04 | 121·66 | 2,875 | 12/3 | ·588 | 1·468 | ·627 | 7·25 | 1,030 | 60 | 106 |
| Bradford ... | 354,000 | 5,971,561 | 62,005,976 | 10·383 | 1·086 | 175 | 113 | 2,703 | 15/11 | ·776 | 1·63 | ·504 | 7·3 | 2,232 | 144 | 242 |
| Brighton ... | 132,265 | 1,118,309 | 11,312,855 | 10 | 1·09 | 85·55 | 82·83 | 3,012 | 7/11 | ·84 | 1·27 | ·788 | 6·41 | 544 | *34* | *50* |
| Burnley ... | 175,000 | 1,449,647 | 15,949,359 | 11 | 1·18 | 91 | 95 | 3,620 | 9/1 | ·744 | 1·25 | ·83 | 7 | 760 | *40* | *57* |
| Burton ... | 48,000 | 437,106 | 3,188,655 | 7·30 | 1·082 | 66 | ... | 1,684 | 5·10 | ·928 | 1·505 | ·58 | 7·5 | ... | ... | 20 |
| Bury ... ... | 128,202 | 1,599,872 | 15,132,553 | 9 | 1·07 | 118·03 | 102·33 | 1,957 | 10 6 | ·535 | 1·24 | ·85 | 8·56 | 506·64 | 42·71 | 54 |
| Chester ... | 39,028 | 346,645 | 3,067,815 | 8·85 | ·96 | 78·6 | 95 | 1,906 | 6/4 | ·626 | 1·27 | ·8 | 7 | 150·60 | 10·04 | 18 |
| Chesterfield | 38,000 | 289,890 | 2,519,533 | 8·69 | 1·1 | 66 | 132 | 2,249 | 6/5 | ·702 | 1·38 | ·75 | 7·33 | 117 | 6·5 | 14 |
| Colchester ... | 44,160 | 323,524 | 1,871,896 | 5·79 | 1·32 | 42·39 | 89·3 | 1,295 | 4/8 | 1·06 | ·85 | 1·09 | 6·81 | 157·92 | 9·87 | 18 |
| Croydon ... | 170,451 | 2,657,824 | 20,504,143 | 7·74 | 1·06 | 120·29 | 125 | 4,734 | 10.7 | ·775 | 2·15 | ·50 | 7·92 | 915·82 | 58 | 75 |
| Darlington ... | 58,000 | 381,920 | 3,791,835 | 9·9 | ·75 | 65·38 | 95·1 | 1,345 | 4/1 | ·557 | 1·219 | ·45 | 6·66 | 151·25 | 11 | 16 |
| Darwen ... | 40,611 | 252,710 | 2,755,011 | 10·91 | 1·24 | 67·83 | ... | 1,989 | 7/- | ·864 | ... | ... | ... | ... | ... | ... |
| Derby ... | 124,000 | E 1,161,854 | 10,857,834 | 9·345 | 1·035 | 87·56 | ... | 2,122 | 7/7 | ·707 | 1·44 | ·75 | 6·375 | ... | ... | 50 |
| | | H. 17,674 | 98,230 | 5·558 | ·962 | | | ... | ... | 1·36 | 1 | 1 | .. | ... | .. | 3 |
| Doncaster ... | 52,000 | 516,540 | 5,072,172 | 9·81 | ·952 | 97·54 | 103 | 1,591 | 7/8 | ·652 | 1·25 | ·76 | 7·5 | 218 | 16 | 25 |
| Dundee ... | 165,000 | 1,389,621 | 17,734,162 | 13·04 | ·857 | 107 | ... | 2,305 | 7/8 | ·533 | 2 | ·50 | 7·3 | ... | ... | 68 |
| East Ham ... | 130,000 | 1,375,433 | 17,775,698 | 12·92 | ·77 | 132 | ... | 5,101 | 8·9 | ·61 | 1·10 | ·65 | ... | ... | ... | 45 |
| Exeter ... | 48,660 | 433,507 | 4,110,513 | 9·48 | ·98 | 84·48 | ... | 2,392 | 6/11 | ·612 | 1 | 1 | 6 | ... | 16 | 20 |
| Gloucester ... | 53,972 | 628,946 | 4,200,432 | 6·7 | ·92 | 77 | 90·75 | 1,078 | 6/- | ·78 | 1·5 | ·65 | 6·78 | 260·3 | 19 | 30 |
| Halifax ... | 176,000 | 2,152,391 | 19,456,923 | 9·04 | 1·27 | 110 | 79·5 | 1,912 | 11/11 | ·86 | 1·35 | ·84 | 6·8 | 814 | 74 | 95 |
| Ilford ... | 82,000 | 843,517 | 7,578,813 | 8·79 | ·831 | 92·42 | ... | 2,312 | 5/1 | ·64 | 1·543 | ·69 | 8 | ... | ... | 26 |
| Ilkeston ... | 32,000 | 238,645 | 1,732,846 | 7·25 | ·9 | 54 | 117 | 1,713 | 6/1 | ·836 | 3·2 | ·35 | 7·5 | 108 | 7·5 | 13 |
| Ipswich ... | 75,300 | 668,025 | 5,554,585 | 8·31 | ·975 | 73·76 | 65·5 | 1,518 | 6/- | ·75 | 1·53 | ·693 | 6·17 | 234·19 | 20·78 | 36 |
| Keighley ... | 42,000 | 242,919 | 2,245,120 | 9·242 | ·98 | 53·45 | 55·42 | 1,568 | 4/7 | ·639 | 2·22 | ·45 | 6·87 | 126 | 7 | 12 |
| Kilmarnock ... | 36,000 | 297,587 | 2,317,709 | 7·78 | ·879 | 64·38 | 90·05 | 1,537 | 4/8 | ·616 | 1·13 | ·86 | 7·22 | 112·58 | 9·05 | 14 |
| Kirkcaldy ... | 39,600 | 473,089 | 5,237,947 | 11·07 | ·719 | 132·27 | 59 | 1,786 | 7/11 | ·46 | 1·522 | ·64 | 7·5 | 195 | 15 | 22 |
| Lancaster ... | 41,414 | 171,475 | 1,461,104 | 8·52 | ·893 | 35 | 75 | 1,132 | 2/8 | ·854 | 1·71 | ·5 | 8 | 88·2 | 6·3 | 12 |
| Leith ... | 81,000 | 954,563 | 9,339,324 | 9·7 | ·87 | 115·30 | 123 | 1,880 | 8·4 | ·46 | 1·32 | ·72 | 8·2 | 320 | 21·33 | 37 |
| Leyton ... | 124,736 | 1,601,833 | 16,897,512 | 10·549 | ·873 | 135 | 104 | 3,324 | 9/10 | ·590 | ... | ... | 7·70 | 574·56 | 42 | 60 |
| Lincoln ... | 20,000 | 160,446 | 1,733,259 | 10·8 | ·92 | 86·66 | 64·08 | 2,264 | 6/8 | ·556 | 1·75 | ·428 | 7 | 90 | 5 | 8 |
| Liverpool ... | ... | 12,590,408 | 134,249,967 | 10·66 | 1·128 | ... | ... | 5,303 | ... | ·756 | 2·45 | ... | ... | ... | 445 | 587 |
| Lowestoft ... | 35,000 | 308,897 | 2,462,188 | 8 | 1·05 | 70·35 | ... | 2,646 | 6/2 | ·878 | univ'rs'l penny fare | | ... | ... | .. | 19 |
| Maidstone ... | 25,000 | 287,179 | 2,096,488 | 7·3 | 1·062 | 83·85 | 70 | 1,319 | 7/5 | ·73 | 1 | 1 | 6·7 | 128 | 12 | 19 |
| Manchester | 950,000 | 18,768,259 | 187,675,183 | 10 | 1·12 | 198 | 95·8 | 4,990 | 17/5 | ·713 | 2·368 | ·422 | 7·25 | ... | 537 | 629 |
| Nelson ... | 45,000 | 200,996 | 2,776,785 | 13·82 | ·88 | 61·71 | 94·09 | 2,650 | 4/4 | ·555 | 1 | 1 | 5·50 | 108 | 6 | 11 |
| Newport ... | 87,626 | 968,067 | 9,251,181 | 9·56 | ·973 | 105·6 | ... | 2,617 | 8/7 | ·821 | 1·75 | ... | ... | ... | 37 | 44 |
| Nottingham | 260,000 | 3,485,789 | 38,484,032 | 11·04 | 1·02 | 148 | 92·08 | 4,514 | 12/8 | ·67 | 1·68 | ·65 | 6·86 | ... | 104 | 135 |
| Oldham ... | 180,000 | 2,049,916 | 21,435,727 | 10·457 | 1·19 | 119·087 | 109·5 | 2,962 | 12/- | ·822 | 1·115 | ·884 | 6·84 | 820 | 51·25 | 92 |
| Perth... ... | 35,900 | 253,851 | 1,861,145 | 7·33 | 1·15 | 51·84 | 96·25 | 1,892 | 5·5 | ·72 | .. | ... | 6·25 | 120 | 8 | 12 |
| Plymouth ... | 112,000 | 809,036 | 8,666,269 | 10·71 | 1·026 | 77·377 | 93·5 | ... | 6/8 | ·667 | ... | ... | ... | 25·5 | ... | 42 |
| Pontypridd . | 40,000 | 470,215 | 4,721,110 | 10·04 | 1·07 | 118 | 83·4 | 2,457 | 10/7 | ·77 | 1·25 | ·81 | 6·5 | 234 | 18 | 26 |
| Rawtenstall | 30,516 | 539,320 | 4,669,522 | 8·66 | 1·24 | 93·39 | 123 | 1,515 | 15/9 | ·69 | 1·12 | ·88 | 9 | 16½ | 12 | 22 |
| Rochdale ... | 130,000 | 1,589,866 | 12,711,114 | 7·99 | 1·35 | 97·7 | 114·90 | 1,825 | 11/2 | ·76 | 1·07 | ·90 | 7·66 | 645 | 43 | 69 |
| Rotherham ... | 64,000 | 720,133 | 7,813,922 | 10·85 | 1·097 | 122·1 | 116 | 2,977 | 11/2 | ·774 | 1·5 | 1 | 12 | 19 | 20 | 36 |
| Salford ... | 350,000 | 5,854,830 | 50,113,120 | 8·559 | 1·243 | 143 | 111 | 3,425 | 14/10 | ·77 | 1·85 | ·85 | 7·853 | 2,075·18 | 144 | 200 |
| Southampt'n | 122,200 | 1,486,746 | 12,348,658 | 8·306 | 1·241 | 101 | ... | 3,592 | 10/5 | ·85 | ... | ... | ... | ... | ... | 68 |
| Southend ... | 78,000 | 637,366 | 7,581,104 | 11·89 | 1·09 | 97·2 | 87 | 4,708 | 8/10 | ·634 | 1·41 | ·76 | 6·5 | 17 | 21 | 31 |
| Southport ... | 31,312 | 485,100 | 4,745,450 | 10·203 | ·945 | 151·55 | 103·7 | 1,734 | 11/11 | ·663 | 1·6 | ·620 | 6·65 | 210 | 14 | 26 |
| So'th Shields | 110,513 | 814,212 | 8,456,688 | 10·386 | ·942 | 76·5 | 129·2 | 3,332 | 6/1 | ·545 | 1·825 | ·54 | 7·61 | 282 | 16 | 35 |
| Stalybridge | 92,933 | 1,085,545 | 8,896,836 | 8·123 | ·943 | 95·7 | ... | 1,280 | 7/6 | ·779 | 1·275 | ·784 | 6·8 | ... | ... | 60 |
| Stockport ... | 120,000 | 1,399,314 | 10,665,098 | 7·6 | 1·341 | 88·8 | 76·6 | 2,158 | 9/11·3 | ·615 | 1·25 | ·72 | 7·5 | 465 | 38 | 50 |
| Sunderland ... | 170,000 | 1,474,637 | 16,972,537 | 11·5 | ·968 | 99·8 | 79·3 | 3,366 | 8/1 | ·550 | 1·34 | ·68 | 7 | 672 | 42 | 70 |
| Wallasey ... | 83,000 | 1,261,855 | 12,352,000 | 9·78 | 1·11 | 148·94 | 98·7 | 2,893 | 13/10 | ·99 | 1·89 | ·54 | 7 | ... | ... | 61 |
| Walsall ... ... | 100,000 | 869,964 | 5,683,798 | 8·535 | 1·293 | 87 | 57 | 1,750 | 6/1 | ·769 | 1·24 | ·77 | 7 | 315 | 21 | 39 |
| Walth'mst'w | 126,000 | 1,004,872 | 12,049,323 | 11·99 | ·762 | 95·63 | 97 | 3,052 | 6/1 | ·569 | 1·15 | ·89 | 7·2 | 408 | 36 | 38 |
| Warrington | 86,000 | 449,206 | 6,064,139 | 13·5 | ·906 | 70·513 | 102·533 | 2,372 | 5/4 | ·584 | 1·246 | ·803 | 6·403 | 192·048 | 12·003 | 21 |
| West Ham ... | 294,200 | 3,544,292 | 40,200,347 | 11·34 | ·822 | 136 | 98 | 4,592 | 9/4 | ·65 | 1·80 | ·56 | 7·66 | 1,262·25 | 99 | 118 |
| Wigan ... | 200,000 | 1,449,188 | 13,018,833 | 8·98 | 1·314 | 65·1 | 105·5 | 2,309 | 7/2 | ·761 | 1·15 | ... | 7·4 | ... | 42 | 67 |
| Wolverh'ton | 135,000 | 1,168,239 | 11,913,122 | 10·198 | 1·08 | 88·25 | 87 | 2,510 | 8/- | ·615 | 1·18 | ·879 | 6·85 | 622·2 | 36·6 | 49 |
| Yarmouth ... | 55,800 | 673,027 | 4,514,871 | 6·7 | 1·256 | 80·91 | 73·7 | 1,687 | 8/6 | ·868 | 1·25 | ·76 | 7 | 375 | 25 | 35 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... | 385,492 | 5,946,689 | 58,437,942 | 9·82 | 1·07 | 151 | 128 | 2,539 | 13/- | ·592 | 1·96 | ·43 | 8·75 | 2,256 | 141 | 282 |
| Bexley ... | 16,000 | 262,658 | 2,130,189 | 8·11 | 1·56 | 133 | ... | 2,360 | 18/11 | ·95 | 1·37 | ·62 | 7·5 | ... | 8 | 16 |
| Birkenhead | 130,832 | 1,235,277 | 13,622,361 | 11·02 | 1·077 | 104·12 | 68·64 | 2,540 | 9/4 | ·702 | 1·39 | ·66 | 6·61 | 511·73 | 49·30 | 59 |
| Bournem'uth | 120,000 | 1,882,054 | 15,750,576 | 8·36 | 1·45 | 131 | 95 | 3,214 | 16/- | ·796 | 1·19 | ·87 | 6·80 | 1,140 | 60 | 81 |
| Cardiff ... | 182,729 | 2,586,421 | 27,561,652 | 10·66 | 1·09 | 151 | 98·5 | 3,947 | 13/9 | ·69 | 1·44 | ·736 | 7·5 | 1,104 | 69 | 130 |
| Coventry ... | 135,000 | 994,207 | 7,639,065 | 7·7 | 1·23 | 57 | 68 | 2,516 | 5·9 | ·757 | 1·18 | ·866 | 6·4 | 424 | 35 | 41 |
| Glasgow ... | 1,150,000 | 23,335,008 | 311,480,086 | 13·348 | ·776 | 270·85 | 105·49 | 5,139 | 17·6 | ·477 | 2·31 | ·44 | 8·13 | 8,484·59 | 606·04 | 843 |
| Huddersfield | 160,000 | (a) 2,383,858 | 21,595,569 | 9·09 | 1·18 | 144 | 120 | 3,675 | 13·4 | ·728 | 1·39 | ·70 | 7·48 | 868·32 | 54·27 | 86 |
| Hull ... ... | 287,032 | 4,040,739 | 42,997,226 | 10·64 | ·877 | 149·80 | 127·10 | 5,141 | 10/7 | ·631 | 2·75 | ... | 9 | 1,393·6 | 87·10 | 160 |
| Leeds ... | 500,000 | 8,795,465 | 89,668,185 | 10·2 | 1·088 | 179 | 113·35 | 3,594 | 16/3 | (b) ·937 | 1·95 | ·539 | 7·48 | 3,190 | 213 | 232 |
| Leicester ... | 229,296 | 3,663,218 | 32,907,795 | 8·983 | ·981 | 143 | 95 | 3,648 | 11/9 | ·693 | 2·18 | ·984 | 8 | 18 | 107 | 140 |
| London ... | ... | H 1,680,786 | 17,347,746 | 10·32 | ·84 | ... | 83 | 2,646 | ... | 1·019 | ... | ... | 6·15 | 742·5 | 55 | 96 |
| | | E 48,777,026 | 516,092,489 | 10·58 | 1·04 | ... | 113 | 8,732 | ... | ·627 | ... | ... | 8·44 | 15,786·8 | 1,179 | 1,584 |
| Newcastle ... | 300,000 | 4,780,662 | 52,204,974 | 10·92 | 1·082 | 174 | ... | 3,738 | 15/2 | ·593 | 1·58 | ·633 | 7 | ... | ... | 192 |
| Northampt'n | 90,793 | 640,158 | 6,727,190 | 10·51 | ·97 | 76·53 | .. | 2,974 | 6 | ·58 | 1·34 | ·7 | 6·91 | ... | ... | 36 |
| Portsmouth | 241,256 | 2,155,508 | 24,520,647 | 11·37 | 1·052 | 101·63 | 84 | 3,505 | 9/- | ·511 | 1·66 | ·62 | 7 | 1,072 | 72 | 100 |
| Preston ... | 120,000 | 970,719 | 9,567,366 | 9·85 | 1·06 | 79·73 | 132 | 2,498 | 7 2 | ·603 | 1·01 | ·95 | 7·36 | ... | ... | 53 |
| Reading ... | 76,000 | 915,180 | 8,251,274 | 9·01 | ·97 | 108 | 97 | 2,505 | 8 8 | ·57 | 1·59 | ·68 | 7 | 352 | 26 | 36 |
| Sheffield ... | 466,408 | 8,071,188 | 96,330,242 | 11·935 | ·893 | 206·535 | 103·32 | 4,606 | 15 5 | ·517 | 2·62 | ·386 | 7·372 | 3,103·27 | 214·019 | 279 |
| Wellington | 68,000 | 2,303,913 | 23,858,412 | 11·08 | 1·40 | 350 | 90 | 4,706 | 43/11 | ·94 | 1·112 | ·88 | 7·86 | 803 | 70 | 89 |

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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## FINANCIAL REPORTS AND MEETINGS.

**Sao Paulo Tramway, Light, and Power.**—The usual quarterly dividend of 2½ per cent. has been declared.

**Anglo-Argentine Tramways.**—The directors have declared an interim dividend of 4 per cent. for the half-year.

**Babcock and Wilcox, Limited.**—The directors announce an interim dividend of 7 per cent. on the ordinary shares for the half-year.

**Brazilian Traction, Light, and Power.**—The directors have declared a dividend of 1½ per cent. on the issued ordinary capital stock.

**Lisbon Electric Tramways.**—An interim dividend of 3 per cent., free of income tax, on account of earnings of current year, has been declared on ordinary shares.

**Calcutta Tramways Company.**—An interim dividend at the rate of 5 per cent. per annum (2s. 6d. per share) on ordinary shares for the half-year is announced.

**Hong Kong Tramway Company.**—The board announce an interim dividend at the rate of 5 per cent. per annum, free of tax, for the six months ended June 30.

**Brisbane Electric Tramways Investment Company.**—An interim dividend at the rate of 8 per cent. per annum (4s. per share) has been declared on the ordinary shares for the half-year.

**Cape Electric Tramways Company.**—The profits for the year ended June 30 were £80,978. To the reserve fund £8,000 has been added, and a dividend of 5 per cent., free of tax, is proposed on ordinary shares, leaving £2,517 to carry forward.

**Sale of Cheltenham and District Light Railway.**—This undertaking, which was opened by the late Mr. T. Nevins in 1901, has been disposed of to J. G. White and Company and Balfour, Beatty, and Company for, it is stated, between £99,000 and £100,000.

**New St. Helens and District Tramways Company.**—The net profits for the year ended June 30, including £901 brought forward, were £4,422. There has been transferred to the reserve £1,000, and a dividend of 2½ per cent. has been declared on the preference shares, leaving arrears of 50½ per cent., and £1,424 carried forward.

**Ferranti, Limited.**—After payment of all charges and expenses of the recent issue of five-year notes, the net profit for the year ended June 30 was £28,142, comparing with £24,333 in the previous year. After payment of debenture and other interests, £10,000 is placed to depreciation and £22,000 to general reserve, carrying forward £452, against £1,245 brought in.

**Record Half-Year at Leeds.**—The earnings of the Leeds tramways for the half-year ended September 30 amounted to the record total of £223,059, an increase of £14,581 as compared with the total for the corresponding half of the last financial year. The passengers carried numbered 47,996,569. The district served by the tramways comprises a population of 525,000, and the average amount expended in car fares per head of the population during the half-year is calculated at 8s. 5d.

**British Interchangeable Rail Company.**—This private company has been registered with a capital of £15,000 in £1 shares, to acquire patents No. 646 of 1911 and 2,466 of 1913, and adopt an agreement with H. Crudgington and H. T. Wakelam. The subscribers are: H. Crudgington, King's Heath, metal merchant; F. W. Alabaster, Birmingham, merchant. The directors are F. N. Layman, E. Randle, E. Grantham, and H. Crudgington. The registered office is at 28, Victoria Street, London, S.W.

**Manchester's Half-Yearly Results.**—Mr. J. M. McElroy has presented his summary of the results of the working of the tramways department during the first half of the financial year. The mileage run was 9,769,574, an increase of 324,047 as compared with the corresponding period of 1912, and the passengers carried numbered 102,144,962, an increase of 9,926,230. The electrical energy used was 726,927 units fewer—14,673,871 as compared with 15,400,798—and the units per car-mile were reduced by ·128—1·502 as compared with 1·630. The revenue per car-mile was at the same time increased from 11·369d. to 11·561d., but the working expenses per car-mile were only increased from 7·002d. to 7·036d.

**Record Nine Months at Liverpool.**—At the last meeting of the expiring municipal year of the Liverpool Tramways Committee, Alderman Fred Smith reported that the first nine months of the present year had proved a record, both as regarded receipts, number of passengers carried, and receipts per car-mile. The receipts amounted to £505,016, compared with £469,016 in 1912, an increase of £36,000, or 7·67 per cent. The passengers numbered 107,457,935, against 99,903,672, an increase of 7,554,263, or 7·56 per cent. The mileage was 10,034,045, against 9,349,669, an increase of 684,376, or 7·32 per cent.; and the earnings per car-mile were 12·07d., against 12·04d., an increase of ·03d.

**The Half-Year at Bradford.**—The tramway receipts for the half-year ended September 30 show that the receipts amount to £158,622, as compared with £147,901 in the corresponding half of 1912. This is an increase in receipts of £10,721, or 7 per cent. The car-miles run were 3,156,070, as compared with 3,033,869, an increase of 122,201 miles, or 4 per cent. The passengers carried during the half-year numbered 34,227,530, as against 31,009,972 in the corresponding six months of last year, an increase of 3,217,558, or 10 per cent. The cost per car-mile has increased owing to the advance of wages to practically every member of the staff, the payment of full sickness benefits to men who are absent from duty owing to illness, and track maintenance costs.

**Melbourne Tramway and Omnibus Company.**—The directors' report shows that the balance remaining after paying 3s. per share in dividends and bonuses for the year, and including £95,991 brought forward from last year, was £202,754. From this they proposed to pay a final bonus of 1s. per share, £48,000; to carry to reserve for return of capital, making it £480,000, £105,741; leaving to carry forward £49,013. The traffic receipts for the year to June 30 improved by £34,181, and 4,284,810 more passengers were carried than during the previous year. The negotiations for the sale of the company's business to the Government that were in progress at the time of the last report ultimately lapsed. For the quarter ended September 30 the directors announced a dividend of 6d. per share and also a bonus of 6d. per share.

**Norwich Electric Tramways Company.**—For the year ended June 30, after providing for debenture interest, etc., and including £575 brought forward, the net profits were £10,561. The directors propose to transfer £2,500 to reserve (raising that fund to £15,179), and recommend a dividend of 3 per cent., leaving £141.—The Hon. Arthur Brand, who presided at the 17th annual meeting on October 29, remarked with pleasure on the facts that the tramways had done better than in the previous year, and that there had been a very considerable increase in the earnings. He mentioned that it was intended to promote a Bill in Parliament to make further improvements in the system. A dividend of 3 per cent. for the year was sanctioned. Mr. Chamberlain was reappointed representative director for the city of Norwich, and Mr. Hopkins, retiring director, was re-elected.

**New South Wales Tramways.**—The report of the Tramways Department for the year ended June 30 last states that the rolling stock consisted of 20 steam motors, 70 steam cars, 1,182 electric motor and 38 trailer cars, and 95 service and other vehicles. The total electric current output for the year at the Ultimo power-house was 89,113,036 kilowatt-hours, of which the alternating-current supply was 78,090,695 kilowatt-hours, and the direct-current 11,022,341. Eight and a half miles of track were treated for corrugations with the Carborundum rail grinder. On June 30 there were 207¾ miles opened for traffic, 12¼ miles having been opened during the year. The total capital expenditure on lines open for traffic amounts to £6,699,305. Seventy-two fronts of cars were enclosed with glass work. The tramways staff numbers 9,170, and during the year the value of the concessions and advances made to the tramways staff, all grades, equalled £282,230 per annum.

**Preston Corporation Tramways.**—In his report for the year ended March 31, Mr. J. F. Simpson, engineer and manager, states that there was an increase in revenue of £2,623, and an addition of 567,296 in passengers. The income was £43,270, and the expenses £24,065. The special charges include three new cars costing £2,412, covering top decks of five cars, new plates for accumulators, etc. The new cars, which are of the single-deck saloon type, and each seating 42 passengers, were built by the United Electric Car Company, the electrical equipment being supplied by Dick, Kerr, and Company. In view of the success of the undertaking, the manager thinks that extensions to outlying districts might seriously be considered, "especially in view of the success that has attended the introduction of methods of traction which do not necessitate the use of expensive permanent way." The car-mileage was 970,719 miles, the average number of car-miles per car per day being 132 miles. The energy consumption was 1·309 units per car-mile, the power costs per unit being ·384d., with an average power cost per car-mile of ·600d. The ratio of working expenses decreased from 59·22 to 55·63 per cent.

**Hurst, Nelson, and Company.**—Sir Thomas Mason, D.L., presided at the annual meeting in Glasgow on October 16. The chairman, in moving the adoption of the report and accounts, made reference to the loss sustained through the death of Mr. Andrew S. Nelson, manager and founder of the business. Mr. Nelson, he said, had been looking forward with great hopes to the result of the year's working. The profits were a matter for congratulation. The results obtained were more favourable than those of previous years, and altogether the balance sheet showed a greatly improved position. They had been able to write off the whole balance of the expenses connected with the formation of the company. He moved that the arrears of the dividend on the preference shares be paid at the rate of 6 per cent., that a dividend of 6 per cent. on the preference share capital from May 15 to November 11 this year be paid, that £5,650 be reserved to pay on May 15 next a half-year's dividend, and that £10,000 be placed to a special reserve fund for security of dividends on the preference share capital. He also moved that a dividend on the ordinary shares of 5s. per share be paid, and that £2,257 be carried forward.



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# TRAMWAY AND OMNIBUS SHARE LIST.

## Specially Compiled for "The Tramway and Railway World."

| Amount Ranking for Dividend. | Shares. | Name. | Div'd. Prev. Half-year. | Div'd. Last Half-year. | Quotations, November 6 | Movement Since Oct. 3. Rise. | Fall. | Latest Business Done. Price. | Date. | Yield on Buying Price. £ s. d. | Dividend Due. (Final in Italics.) | Quotations, Jan., 1908, to Nov. 6, 1913. Highest | Lowest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 640,000 | 5 | Anglo-Argentine Tramways 5½% Cum. 1st Pref. | 2/9 | 2/9 | 4⅜—4½ | ... | — 1/16 | 95/- | Nov. 6 | 5 13 0 | Jan., Dec. | 5 1/16 | 4½ |
| 500,000 | 5 | Do. do. 5½% Cum. 2nd Pref. | 2/9 | 2/9 | 4 1/16—4 3/16 | ... | — 1/16 | 92/6 | Oct. 14 | 6 4 0 | June, *Dec.* | 5 1/16 | 4 1/16 |
| 1,500,000£ | ... | Do. do. 5% Deb. Stock Red. | 5% | 5% | 98½—100½ | ... | ... | 99¾ | Nov 6 | 5 1 0 | June, Dec. | 105½ | 95½ |
| 325,532£ | Stk. | Auckland Elec. Trys. Co. 5% Mort. Deb. .. | 5% | 5% | 100—102 | ... | ... | 101 | Oct. 29 | 4 18 0 | Jan., July. | 107 | 101 |
| 75,000 | 1 | Bath Electric Tramways 5% Cum. Pref. ... | 6d. | 6d. | 5/16—3/8 | ... | ... | 14/6 | Dec. 31 | 6 8 0 | *Jan.* & July | 1/8 | 1/16 |
| 334,696£ | Stk. | Birmingham Dist. Pow. & Tract. 4½% 1st Deb.... | 4½% | 4½% | 86—88 | ... | — 1 | 86½ | Oct. 8 | 5 2 3 | Jan., July. | 96 | 77 |
| 15,000 | 10 | Blackpool and Fleetwood Tramways ... .. | 9/- | 4/- | 13½ -13¾ | ... | ... | 13⅜ | Sept. 8 | 4 14 6 | Feb., Aug. | 14½ | 12 |
| 60,000 | 10 | Bombay Elec. Supply & Trys. Co. 6% Cum. Pref. | 6/- | 6/- | 10¾—11½ | ... | ... | 11⅛ | Sept. 5 | 5 6 9 | Feb., Aug. | 12½ | 7⅞ |
| 1,003,614 | $100 | Brazil Traction... ... ... ... ... ... | 6 | 6 | 85½—87½xd | ... | — 8 | 87½ | Nov. 6 | 7 1 3 | Fb.My Ag.Nv. | 105½ | 83½ |
| 75,000 | 5 | Brisbane Elec. Tramways Investment Co. Ord. | 4/- | 4/- | 7¼—7¾xd | + 1/16 | ... | 7 1/8 | Nov. 6 | 5 6 0 | *May*, Oct. | 9½ | 3 1/16 |
| 75,000 | 5 | Do. do. do. 5% Cum. Pref. | 2/6 | 2/6 | 4⅛—5⅛xd | + ⅛ | ... | 5 1/16 | Nov. 3 | 4 13 0 | *May*, Nov. | 5⅛ | 4⅛ |
| 50,000 | 10 | Bristol Tramways and Carriage Co. ... ... | 4 | 4 | 5½—5¾ | ... | — ⅛ | 5½ | Oct. 29 | 6 19 3 | *Feb.*, Aug. | 14½ | 5 |
| 50,000 | 10 | Do. do. do. 4% Cum. Pref. | 4 | 4 | 6¾—7¼ | ... | ... | 7 | Sept.30/12 | 5 10 6 | Jan., July. | 9¼ | 6¾ |
| 800,000£ | Stk. | British Columbia Electric Railway Def. Ord. .. | 8% | 8% | 118—122 | ... | — 5 | 119 | Nov. 6 | 6 11 3 | May, Nov. | 156 | 116⅝ |
| 800,000£ | Stk | Do. do. Pref. Ord. ... .. | 6% | 6% | 105—109 | ... | — 5 | 108 | Nov. 6 | 5 10 3 | Feb., Aug. | 132½ | 105 |
| 800,000£ | Stk | Do. do. 5% Cum. Perp. Pref. | 5% | 5% | 99—102 | ... | ... | 100¼ | Nov. 6 | 4 19 3 | Jan., July. | 114 | 98½ |
| 1,070,097£ | Stk. | British Electric Traction Prefd. Ord. ... ... | ... | ... | 11—13 | ... | — 1 | 12½ | Nov. 6 | ... | Apr., *Oct.* | 16 | 8 |
| 403,503£ | Stk. | Do. do. 6% Cum. Pref. .. | 6% | 6% | 86—89 | ... | ... | 86½ | Nov. 5 | 6 15 9 | Feb., *Aug.* | 95½ | 78 |
| 1,464,245£ | Stk. | Do. do. 5% Perp. Deb. ... | 5% | 5% | 89—92 | ... | — 3 | 91 | Nov. 5 | 5 8 9 | April, Oct. | 101 | 82½ |
| 439,796£ | Stk. | Do. do. 4½% 2nd Deb. Red. ... | 4½% | 4½% | 75—78xd | + 1 | ... | 77 | Nov. 3 | 5 15 6 | May, Nov. | 84 | 58 |
| 246,625£ | Stk. | Buenos Aires Port & City Trys. 6% 1st Mt. Deb. | 6% | 6% | 87—91 | ... | ... | 90¾ | Aug. 20 | 6 12 0 | Feb., Aug. | 103 | 61 |
| 623,270£ | Stk. | Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb. | 5% | 5% | 98½—100½ | ... | — ½ | 99 | Nov. 5 | 5 0 0 | Mar., Sept. | 103 | 89 |
| 137,610 | 5 | Calcutta Tramways Ord. ... ... ... ... | 5/- | 2/6 | 6—6½ | ... | ... | 6¼ | Nov. 4 | 5 15 6 | *Apr.*, Oct. | 7¼ | 4 |
| 47,295 | 5 | Do. 5% Cum. Pref. ... ... | 2/6 | 2/6 | 5—5¼ | + ⅛ | ... | 5 | Oct. 21 | 4 15 3 | Jan., July | 5⅜ | 4⅜ |
| 491,222 | 1 | Cape Electric Tramways ... ... ... ... | 1/- | for '12 | 1/16—1/8 | ... | ... | 14/3 | Nov. 3 | 6 3 3 | Feb., *Nov.* | 1/8 | 1/8 |
| 15,000 | 10 | Carthagena and Herrerias Steam Tramways ... | 4/- | May, '13 | 3—3⅜ | ... | ... | 75/- | May 6 | 5 6 9 | April. | 7 | 3 |
| 248,000 | 5 | City of Buenos Ayres Tramways (1904) ... | 2/6 | 2/6 | 5⅛—5⅜ | ... | — ⅛ | 5 1/16 | Nov. 5 | 4 13 0 | Fe My.Au.No | 6 | 5⅛ |
| 120,000£ | Stk. | Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ... | 5% | 5% | 88—92xd | ... | ... | 96 | Jan. 31 | 5 8 9 | May, Nov. | 101 | 87 |
| 11,500 | 10 | Cork Electric Tramways and Lighting Co. ... | ... | 6/- ann. | 4¼—4¾ | ... | ... | 4 1/16 | Dec. 23 | 6 6 6 | *Mar.* | 10 | 4½ |
| 12,327 | 10 | Do. do. do. 5% Cum Pref. | 5/- | 5/- | 7¼—7¾ | ... | ... | 8 1/16 | June 12 | 6 9 0 | Jan., July | 10⅜ | 7½ |
| 3,000 | 10 | Dublin and Lucan Elec. Railway 5% Cum. Pref. | 5/- | 5/- | 8¼—8¾ | ... | ... | 9 | Aug. 25/10 | 5 14 3 | Sep.15, Mar.15 | 9¼ | 6 |
| 60,000 | 10 | Dublin United Tramways Co. (1896), Ltd., Ord. | 6/- | 6/- | 10½—11 | + ¼ | ... | 10¾ | Nov. 6 | 5 9 3 | Feb., Aug. | 14 | 11 |
| 60,000 | 10 | Do. do. do. 6% Cum. Pref. | 6/- | 6/- | 11¾—12¼ | + ¼ | ... | 12 | Nov. 3 | 4 18 0 | *Feb.*, Aug. | 14 | 11½ |
| 13,500 | 10 | Gateshead & District Trys. Co. Ord. ... ... | 9/- | 5/- | 9—9½ | + ½ | ... | 8¾ | Oct. 17 | 7 7 6 | *Mar.*, Sept. | 9½ | 7⅛ |
| 268,235 | 10/- | Hastings and District Elec. Trys Ord. ... ... | ... | ... | 1/2—3/4 | ... | ... | 1/9 | Jan. 5/12 | ... | ... | 3/16 | 1/16 |
| 80,000 | 1 | Do. do. 6% Cum. Pref. ... | 6% | 6% | ⅞—1 | ... | ... | 12/6 | June 6 | 8 0 0 | ... | 1 1/16 | 13/16 |
| 125,000£ | Stk. | Do. do. 4½% Deb. Stk. Red. | 4½ | 4½ | 66—71 | ... | ... | 68½ | Aug. 19 | 6 6 9 | April, Oct. | 100 | 68 |
| $9,634,000 | $1,000 | Havana Elec. Rly. Co. Con. Mort. 5% ... ... | 5% | 5% | 94½—98½ | ... | ... | 98⅜ | Oct. 15 | 5 4 3 | Feb., Aug. | 105 | 80 |
| 195,000£ | 100 | Hong Kong Tramways Co. 5% Mt. Deb. .. | 5% | 5% | 87—92 | ... | ... | 89⅜ | Nov. 3 | 5 8 9 | May, Nov. | 92 | 75½ |
| 20,000 | 10 | Imperial Tramways Ord. ... ... ... ... | Nil | 4% year | 3⅜—4¼ | ... | ... | 9¾ | Oct. 29/09 | 9 8 6 | Feb., Aug. | 9⅜ | 2½ |
| 20,000 | 10 | Do. 6% Cum. Pref. ... ... | Nil | 6% year | 6¼—6⅝ | ... | — ¼ | 6 5/16 | Ju. 28/09 | 8 18 0 | Jan., July. | 9⅜ | 2⅜ |
| 30,000 | 5 | Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref. | 2/6 | Dec. '12 | 2 1/16—2 1/16 | ... | ... | 46/3 | Nov. 30/12 | 4 17 6 | *Mar.*, Sept. | 3 | 2 |
| 250,000 | 1 | Kalgoorlie Electric Tramways ... ... ... | ... | ... | 0—1/16 | ... | — 1/16 | 1/- | Jan. 15/12 | ... | *May* | 3/16 | 0 |
| 170,000 | 1 | La Plata Elec. Trys. Co. 6% Cum. Pref. ... | 0·4·65 | 0·4·80 | ⅞—1 | ... | ... | 17/- | Oct. 14 | 6 0 0 | *April*, Oct. | 1 1/16 | ¼ |
| 30,800 | 10 | Lanarkshire Tramways ... ... ... ... | 6/- | 6/- | 9¾—10¼ | ... | ... | 10 1/16 | Sept. 25 | 5 17 3 | Feb., Aug. | 10 1/16 | 9⅜ |
| 250,000£ | Stk. | Lancashire United Trys. 5% Prior Lien Deb.... | 5% | 5% | 77—81 | ... | ... | 78¾ | Oct. 11 | 6 5 0 | Jan., July. | 95 | 76 |
| 634,026 | 1 | Lisbon Electric Tramways Ord. ... ... ... | 7⅛d. | 7⅛d. | 1—1¼ | ... | ... | 22/3 | Aug. 25 | 4 16 0 | *July.* | 1 3/16 | 7/8 |
| 425,553 | 1 | Do. do. 6% Cum. Pref ... | 7⅛d. | 7⅛d. | 1 1/16—1 3/16 | ... | ... | 22/6 | Feb. 15 | 5 1 3 | Jan., July. | 1½ | 1 1/16 |
| 1,666,673 | 1 | London and Suburban Traction Ord. ... ... | ... | ... | ¼—⅜ | ... | ... | 5/9 | Oct. 23 | ... | ... | 3/8 | ¼ |
| 1,316,268 | 1 | Do. do. do. 5% Cum. Pref. | ... | 5 | 4½—5½ | ... | ... | 11/6 | Nov. 5 | 7 12 6 | Feb., Aug. | 5 1/16 | 3 1/16 |
| 1,000,000£ | Stk. | London General Omnibus 4½% 1st Deb. ... ... | ... | 4½ | 95—97 | ... | — 1 | 95½ | Nov. 6 | 4 14 0 | Jan., July. | 98½ | 92½ |
| 1,000,000£ | Stk. | Do. do. 5% Cum. Income ... | 5 | 5 | 85—87 | ... | — 2 | 86½ | Oct. 29 | 5 15 0 | Feb., Aug. | 94 | 86 |
| 1,649,930£ | Stk. | London United Tramways 4% 1st Deb. Stk. ... | 4 | 4 | 58—62 | ... | — 2 | 59 | Nov. 6 | 6 11 3 | *Jan.*, July. | 82 | 54¾ |
| 63,430£ | Stk. | Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ... | 5% | 5% | 101—103 | ... | ... | 101½ | Oct. 16 | 4 17 3 | Jan., July. | 105 | 86 |
| 20,000 | 5 | Do. Do. Do. 6% Cum. Pref. ... | ... | ... | 4¾—5⅛ | + ⅛ | ... | 5 | Oct. 27 | 5 17 3 | ... | 5 1/16 | 87 6 |
| 300,000£ | 100 | Manaos Trys. & Ltg. Co. 5% 1st Debs. ... ... | 5% | 5% | 87—89 | ... | ... | 87½ | Aug. 1 | 5 16 3 | Jan., July. | 97 | 86 |
| $4.785,000 | $1.000 | Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds. | 5% | 5% | 96½—98⅛ | ... | — ½ | 96½ | Oct. 27 | 5 4 6 | Mar., Sept. | 104⅛ | 84 |
| 60,000 | 1 | Mansfield & District Trys. Ltd. 6% Cum. Pref. | 7⅛d. | 7⅛d. | 1/2—1 1/16 | ... | ... | 18/6 | Sept. 24 | 5 16 3 | Mar., Sept. | 1 1/16 | 3/8 |
| $20.000,000 | $100 | Mexico Tramways Common Stock ... ... | $3½ | $3½ | 74—78xd | ... | — 14¾ | 75¾ | Nov. 6 | 9 4 3 | Fb.My.Au.No | 151½ | 65 |
| $3,840,000 | ... | Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds | 5% | 5% | 90½—92½xd | ... | ... | 91 | Nov. 6 | 5 11 0 | May, Nov. | 101½ | 90½ |
| 600,000£ | 100 | Montreal Street Rly. 4½% Ster. Debs. ... ... | 4½% | 4½% | 97—104 | ... | ... | 100⅜ | Oct. 28 | 4 10 0 | Fe.My.Au.No. | 107 | 97 |
| 150,000 | 1 | National Steam Car ... ... ... ... ... | 2/- | year | 1½—1¾ | + 1/16 | ... | 23/9 | Nov. 6 | 8 0 0 | Dec. | 39/9 | 18/- |
| 5,000 | 10 | Oldham, Ashton, and Hyde Elec. Tramways Ord. | 7/- | 5/- | 5⅛—6⅛ | ... | — ⅛ | 7 | Apr. 2 | 9 16 0 | Mar., Aug. | 9⅜ | 6¼ |
| 5,000 | 10 | Do. do. do. 5% Cum. Pref. | 5% | 5% | 6⅜—6⅝ | + ¼ | ... | 6 1/16 | July 8/12 | 7 18 0 | Feb., Aug. | 8½ | 6¼ |
| 77,893 | 5 | Para Elec. Rly. and Ltg. Co., Ord. ... ... | 5/- | 5/- | 5—5½ | ... | — 1 | 5 | Nov. 5 | 9 1 9 | May, Nov. | 8 | 5 |
| 100,000 | 1 | Perth (W.A.) Electric Tramways Ord. ... ... | 6d. | 7⅛d. | 1⅛—1⅜ | ... | ... | 25/6 | Nov. 8/12 | 4 0 0 | *Sept.*, Nov. | 26/10½ | 3/8 |
| 245,000 | 1 | Potteries Electric Traction Ord. ... ... ... | 3½ | for '11 | 1/2—7/8 | + 1/16 | ... | 8/3 | Nov. 3 | 8 0 0 | April. | 3/8 | 1/8 |
| 245,000 | 1 | Do. do. 5% Cum. Pref. ... | 6d. | 6d. | 1/16—1/8 | ... | ... | 12/6 | July 2 | 7 5 6 | *Feb.*, Aug. | 1/4 | 1/16 |
| 124,560 | 1 | Provincial Tramways Ord. ... ... ... ... | 10d. | 8d. | 5/16—6/16 | ... | ... | 14/6 | June 26 | 9 12 0 | May, *Nov.* | 1 1/16 | 13/- |
| 10,000 | 10 | Do. do. 6% Cum. Pref. ... ... | 6/- | 6/- | 9¼—9½ | ... | ... | 9¼ | Oct. 30 | 6 8 0 | June, *Dec.* | 11 | 9 |
| 50,000 | 5 | Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref. | 3/- | 3/- | 5—5⅛ | ... | ... | 5 1/16 | July 17 | 5 9 3 | June, Dec. | 6 | 5 |
| 32,000 | 10 | Shanghai Elec. Construction Co. ... ... ... | 10/- | year | 10½—11½ | + 1½ | ... | 11 | Nov. 6 | 4 7 0 | May. | 11⅛ | 6 |
| 330,400£ | Stk. | Singapore Elec. Trys. Ltd., 5% Debs. Red. ... | 5% | 5% | 86—90 | ... | ... | 87 | July 29 | 5 11 3 | Mar., Sept. | 89 | 61 |
| 169,570 | 1 | S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref. | 1/2⅜ | May, '12 | ⅜—¾ | ... | ... | 15/9 | May 16,'12 | 8 0 0 | Feb., Aug. | 1⅛ | ⅜ |
| 91,720£ | Stk. | Southern Elec. Trys. of B.A., 1st Mt. Deb. ... | 5% | 5% | 93—95 | ... | ... | 94½ | Aug. 7 | 5 4 9 | Feb., Aug. | 100 | 90 |
| 471,500£ | 100 | Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ... | 4½% | 4½% | 97—99 | ... | ... | 99½ | Aug. 20 | 4 11 0 | Feb., Aug. | 104 | 97 |
| 80,000 | 5 | United Elec. Tramways of Monte Video, Ord.... | 3/- | 4/- | 4⅛—5⅛ | + ¼ | ... | 4⅛ | Nov. 6 | 6 13 0 | *June*, Dec. | 6¼ | 4⅜ |
| 90,000 | 5 | Do. do. do. 6% Cum. Pref. | 3/- | 3/- | 5—5⅜ | + 1/16 | ... | 5⅜ | Oct. 28 | 5 11 9 | June, Dec. | 6⅜ | 4 1/16 |
| 500,000£ | Stk. | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs. | 4½% | 4½% | 98½—100½ | ... | ... | 100 | Oct 31 | 4 9 6 | Apr., Oct. | 109½ | 98½ |
| 40,977 | 5 | Yorkshire (West Riding) Elec. Trys. Ord. ... | ... | ... | ⅛—¼ | ... | ... | 8/- | Oct. 31 | ... | *Mar.* | 1½ | ⅜ |
| 46,261 | 5 | Do. do. do. 6% Cum. Pref. | 1/6 | 1/6 | 3½—4 | + ⅛ | ... | 74/6 | Oct. 16 | 3 15 0 | *Mar.* | 4 | 1¼ |

## ELECTRIC RAILWAY SHARES.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,854,720£ | Stk. | Central London Ord. Stock (4% Guar.) ... ... | ... | ... | 78—80 | ... | — 1 | 78¾ | Nov. 4 | 4 18 9 | *Feb.*, Aug. | 89½ | 59⅛ |
| 572,640£ | Stk. | Do 4% Guar. Pref. Stock ... ... | 4 | 4 | 81—83 | ... | ... | 82½ | Nov. 6 | 4 16 6 | Feb., Aug. | 92 | 80 |
| 572,640£ | Stk. | Do. Deferred Stock (4% Guar ) ... | ... | ... | 77—79 | ... | — 2 | 78 | Nov. 6 | 4 18 9 | Feb., Aug. | 91⅜ | 42 |
| 50,000 | 10 | Liverpool Overhead Ord. ... .. .. ... | 2/- | 2/6 | 4¼—4⅜ | + 1/16 | ... | 85/- | Nov. 3 | 5 7 6 | *Feb.*, Aug. | 4 | ⅜ |
| 1,412,263£ | Stk. | Mersey Cons. Ord. Stock ... ... ... ... | Nil | Nil | 5—5½ | ... | — ¼ | 5 | Oct. 30 | ... | *Feb.*, Aug. | 8 | 1 |
| 5,732,062£ | Stk. | Metropolitan Cons. ... ... ... ... .. | 1⅜ | 1⅜ | 40⅛—40¾ | ... | — 3/8 | 40⅛ | Nov. 6 | 3 10 3 | *Feb.*, Aug. | 75⅛ | 34 |
| 2,640,914£ | Stk. | Do. Surplus Lands Stock ... ... ... | 2¾ | 2¾ | 58—60 | ... | — 1 | 59¾ | Nov. 5 | 4 10 3 | *Feb.*, Aug. | 72 | 58 |
| 3,235,000£ | Stk. | Metropolitan District Ord. ... ... ... ... | Nil | Nil | 28¾—29⅛ | ... | — 5 | 28⅜ | Nov. 6 | ... | *Feb.*, Aug. | 51⅛ | 9½ |
| 500,000 | 10 | Underground Electric Railways Co. of London ... | ... | ... | 3⅛—3¼ | .. | — ¼ | 72/6 | Nov. 5 | ... | ... | 5 1/16 | 1⅜ |
| 1,730,000£ | ... | Do. 4½% Bonds of 1933 ... ... ... | 4½% | 4½% | 99—101 | ... | ... | 100⅛ | Nov. 6 | 4 9 0 | Jan., July | 102 | 73 |
| 1,192,707£ | ... | Do. 6% 1st Income Debs. ... ... | 6% | 6% | 110—112 | ... | ... | 111⅛ | Nov. 6 | 5 7 3 | Mar., Sept. | 117½ | 108 |
| 6,120,750£ | Stk. | Do. 6% Income Bonds ... ... ... | 60/- | 60/- | 88—89 | ... | — 2⅛ | 88¼ | Nov. 6 | 6 11 3 | Mar., Sept. | 97½ | 18 |
| 1,150,477 | 1/- | Do. "A" Ord. ... ... ... ... | ... | ... | 1/2—7/8 | ... | ... | 9/3 | Nov. 5 | ... | ... | 1/4 | 1/8 |

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## PERSONAL.

**Mr. H. A. Goodyer,** of Walsall, has been appointed chief clerk in Coventry Corporation tramways department.

**Mr. Frank Buckley,** tramways manager to Wigan Corporation, has been granted an increase in salary of £25 per annum.

**Mr. W. H. Milnes,** assistant engineer, Coventry Corporation Tramways, has had his salary increased from £180 to £200 per annum.

**Dr. Hans Goldschmidt,** whose name is well known in connection with the patent alumino thermic process, has been granted the title of Professor.

**Mr. H. S. Banner** has been appointed an inspector on the Southport Corporation tramways. Mr. Banner entered the service in May, 1902.

**Mr. A. T. Goward,** manager of the British Colombia Electric Railway Company at Victoria, has left that city on a visit to the directors in London.

**Mr. J. E. Waller** has been paid £52 10s. for professional services rendered in connection with the tramways provisions of the Coventry Corporation Act, 1913.

**Mr. Arthur Kenworthy,** chief electrical engineer to Barnsley and District Electric Traction Company, was married to Miss Morris, at Barnsley, on October 22.

**Mr. J. R. Taylor,** chief clerk, Ashton tramways department, has resigned consequent upon having been appointed to a similar position at Walsall, his native town.

**Mr. H. J. Somerset** has retired from the position of manager of the Perth (W.A.) Tramways, which have been purchased by the Government, and is returning to England.

**Mr. J. Willey,** late rolling stock foreman, Isle of Thanet Electric Tramways Company, has been presented with an oak writing desk and an oak umbrella stand on the occasion of his departure to enter a local business.

**Alderman Linsley,** chairman of Salford Corporation Tramways Committee, and the new president of the Municipal Tramways Association, is the first president elected from outside the ranks of tramway managers.

**Mr. A. M. B. Grahame** was appointed managing director of Hurst, Nelson, and Company at the annual meeting of the shareholders, in the place of the late Mr. Andrew S. Nelson. Mr. George W. Chalmers, works manager, was elected a director.

**Mr. E. J. Doran,** after acting for six months as assistant tramway traffic superintendent of the New South Wales Tramways at Sydney, during the absence of Mr. H. F. Brown, on leave of absence prior to retirement, has received the permanent appointment to that position.

**Sir John Courtis,** chairman of Cardiff Tramways Committee, speaking at a luncheon given in connection with Grove House by the Cardiff Corporation, said he had returned from his Canadian tour with big ideas, after seeing some of the cities there, as to what Cardiff should do.

**Mr. G. C. I. Stuart,** of the Manchester Council's electricity works, and formerly resident engineer at the Brakpan power-station of the Victoria Falls and Transvaal Power Company, has been appointed superintendent of the Buenos Ayres power-station of the Central Argentine Railway.

**Councillor Hargreaves, J.P.,** vice-chairman of Hull Tramways Committee, has accepted an invitation to become mayor of the city. Mr. and Mrs. Hargreaves recently opened a bazaar, at which £120 was raised for the tramways band, and they were congratulated by Mr. W. J. McCombe, the manager, on the honour about to be conferred upon them by the Corporation.

**Mr. J. Dalrymple,** Glasgow tramways manager, and Mr. Nisbet, master of works, on October 1 had reached Vancouver in the course of their tour to inspect tramway systems and bridges. They were greeted by many former employees of the Glasgow Corporation, nearly a hundred ex-Glasgow tramwaymen now being employed on the tramways, etc. The travellers arrived at Glasgow on October 27.

**Mr. C. W. G. Little,** chief electrical engineer of the British Electrical Federation, Limited, on behalf of the Swansea Improvements and Tramways Company, who are lessees of the Mumbles Railway and Pier undertaking, is advising the company on the subject of the proposed electrification of the railway from Swansea to the Mumbles, which was described and illustrated in our issue of June 13, 1912.

**Mr. Alfred Clough,** late resident electrical engineer to the Liverpool Corporation, has been presented with two divan chairs and an illuminated address by the electric supply department. The presentation was made by Alderman Fred Smith, chairman of the Tramways and Electrical Power Committee, who was supported by Mr. C. W. Mallins (tramways manager), Mr. H. Dickenson (city electrical engineer), etc.

**Mr. G. Cardwell,** general manager of the Devonport and District Tramways Company, has been presented with a silver tea and coffee urn by the staff and employees on the occasion of his marriage. The presentation took place at a dinner and smoking concert, Inspector Murton presiding. Acting Chief Inspector Goodridge made the presentation, and on behalf of the staff wished Mr. and Mrs. Cardwell the best of health. Mr. Cardwell thanked the donors for their kindness.

**Mr. Leonard Johnston** has been congratulated by Gloucester Tramways Committee upon obtaining the appointment of manager of the Southampton Corporation Tramways, where he began duty in the third week of October. Alderman Talbot, chairman of the committee, mentioned that a deputation from Southampton visited the city in connection with the appointment. Alderman Dunsford, the chairman of the Southampton Tramways Committee, went to the depôt and looked over everything, and was very pleased with what he saw. He also went over the track and examined it very minutely, and afterwards said that Gloucester had a system of which it ought to be proud.

**Mr. Peter Fisher,** manager of the Dundee Tramways, and Mr. Robertson, manager of the Greenock Council's electricity department, have been consulted by the Stirling Corporation with regard to Messrs. Balfour, Beattie, and Company's offer to carry out the electrification of the tramways and to purchase the power-station. Mr. Fisher has been congratulated by Dundee Tramways Committee on his election as vice-president of the Municipal Tramways Association, which will meet at Dundee in 1915. Convener G. A. Johnston observed that the appointment was a compliment to Dundee as well as to Mr. Fisher, who was recoguised as being a thoroughly up-to-date tramway manager.

**Dinner to Mr. and Mrs. Wyld.**—Mr. W. Wyld (late manager of the Birkenhead Electricity Supply Company and Tramway Department) and Mrs. Wyld were entertained by a number of friends to dinner at the Imperial Restaurant, Regent Street, W., on October 3, to welcome them to London and to congratulate Mr. Wyld on his appointment as borough electrical engineer to Hampstead Corporation. The chair was taken by Mr. H. E. Blain, who, after the loyal toast, proposed the health of the guests. Mr. Wyld responded, and gave a biographical sketch of his career. Commencing with Blackpool, he took the company in imagination to Salford, Wednesbury, Doncaster, and Birkenhead, and finally to Hampstead, with which he expressed great satisfaction.

**Alderman Fred Smith,** whose accession to the chair of the Liverpool Tramways Electric Power and Lighting Committee last year was marked by considerable discussion, was, on October 10, at the closing meeting of the committee for the municipal year, accorded a vote of thanks on the motion of Major Clarke, seconded by Mr. Hutchinson, and supported by Councillors Clancy, Gates, and Robinson. In responding, he remarked that he was in his fifteenth year of service on the Tramways Committee. He had every reason to be thankful for the help that had been given to him by every member of the committee and all the officials attached to the committee. He moved a vote of thanks to the deputy-chairman, Major Clarke, who, he said, had been very helpful to him in the work of the committee. He had never seen a member of the Council who had taken more work in hand. Councillor W. J. Bailes was thanked for his services as chairman of the Electrical Sub-Committee.

**Mr. J. S. D. Moffet** has been presented with a canteen of cutlery by the chief officers of Rochdale Council upon his departure to take up the duties of general manager of the West Ham Tramways. The gift was handed over by Mr. T. R. Ball, the gasworks manager, and speeches were also made by Mr. W. H. Hickson (town clerk), Mr. S. Platt, and Mr. G. Webster, the new manager of the tramways. The town clerk referred to the able assistance he received from Mr. Moffet in connection with Parliamentary bill work. Mr. L. S. Platt, borough surveyor, mentioned that Mr. Moffet came to Rochdale as one of his assistants. He paid tribute to the efficiency with which he superintended the construction of the tramways. Having been so closely associated with the initial work, following the municipalisation of the system, it was fitting that Mr. Moffet should obtain the general managership. All through the years of Mr. Moffet's service in Rochdale they had been in most friendly co-operation.

**Local Government Officers' Presentation to Mr. H. E. Blain.**—At the annual dinner of the National Association of Local Government Officers on October 18, Mr. H. E. Blain, late general manager of the West Ham Corporation Tramways, was the recipient of a handsome token of the regard in which he is held by the members. Mr. H. E. Blain was one of the founders, and it is chiefly as a result of his efforts that the Association holds such a strong position. Opportunity was taken of Mr. Blain's retirement from the municipal service to make a presentation to him in recognition of his valuable work. Sir Homewood Crawford, city solicitor, London, and president of the Association, proposed the health of Mr. Blain, and on behalf of himself and the members presented him with a handsome solid silver Georgian tray and a gold watch and chain, both bearing the following inscription: "Presented to Herbert E. Blain, Esq., by the president and members

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of the National Association of Local Government Officers as a slight appreciation of his valuable work for the Association particularly, and in the interests of the Local Government Service generally." The president referred to the great regard in which Mr. Blain is held by all local government officers, and to the severe loss to local government, which his recent appointment necessitates. Mr. Blain was received with prolonged cheers on rising to respond to the toast, after which he returned thanks to the members, and expressed himself unable to voice his deep sense of appreciation of the kindly feeling shown him by the whole of the members.

**Mr. G. F. Milnes,** whose death at Birkenhead is announced, was for many years connected with the firm of G. F. Milnes and Company, which ultimately became absorbed in the United Electric Car Company, Limited. Mr. Milnes was afterwards the resident representative of that company in London. His son, Mr. G. C. Milnes, who is now in Alberta, and Mr. Voss established the firm of Milnes, Voss, and Company, of which Mr. Voss is now the head.

**Mr. J. H. Cawthra,** who, during the past two years had been chief mechanical engineer to the Victoria Falls and Transvaal Power Company, died on October 8 from injuries received while he was motoring near Johannesburg, the car colliding with a train at a level crossing. Mr. Cawthra was from 1901 borough electrical engineer at South Shields, and he had also held a similar position at Swansea. He had also held the appointment of chief assistant electrical engineer at Leeds electricity works.

## CONTRACTS AND ORDERS.

**Chamberlain and Hookham, Limited,** have a contract from Cleethorpes Urban District Council for prepayment meters.

**United Electric Car Company,** of Preston, have received a contract to supply two top-deck covers for cars to Lancaster Council.

**Bury Council** have accepted the tender of J. Musgrave and Sons for the supply of a 3,000-KW. turbo-alternator with exciter and surface condenser.

**Blackpool Council** have sealed a contract with Richardsons, Westgarth, and Company for the supply of a 1,000-KW. turbo-generator and condensing plant.

**The "M and G" Truck and Engineering Company, Limited,** have secured from Aberdeen Corporation the contract for six trucks of their rigid wheel base, 21 E.M. type.

**The Canadian General Electric Company** have secured the contract for the electrification of the Mount Royal Tunnel of the Canadian Northern Railway, which is to open up the suburbs of Montreal.

**Dundee Tramways Committee** have accepted the tender of Mr. D. Horsburgh for excavating, concreting, and paving, etc., the road in connection with the extension of the Blackness Road tramways, at £6,471.

**Ramsbottom Council** have accepted the tender of the Polack Tyre and Rubber Company, Limited, Manchester, for tyres for the railless trolley cars for twelve months, and of Mr. Rawlinson for a tower wagon.

**Walthamstow Council** have accepted the tender of J. Baker and Company for a supply of a dozen special tramcar axles at £3 3s. per axle, and that of W. T. Henley's Telegraph Works, Limited, for a supply of feeder cable.

**Clough, Smith, and Company, Limited,** Spencer House, South Place, London, E.C., have secured from Keighley Corporation the contract for the erection of the 6,600-volt high-tension transmission line between Keighley and Bingley.

**Derby Council** have accepted the following tenders: British Thomson-Houston Company, Limited, switch gear, £943; Simkiss and Knighton, cast-iron piping for turbine, £246; Aiton and Company, steel piping for turbine, £142; Newton Brothers, balancer, £179.

**Hurst, Nelson, and Company** have received a contract from Leeds Corporation for the supply of car bodies and trucks, at £12,850. Alderman Tetley informed the Council that their own car works could not turn out the cars sufficiently quickly, and that this tender was practically the lowest one received.

**Messrs. Belliss and Morcom and Siemens Brothers** have supplied the turbine and generating plant installed in the Croydon Corporation electricity station. The capacity is about 3,000 H.P., and the cost £7,000. The turbines can be worked either with high-pressure steam or with exhaust steam, and a great saving in the coal bill is thereby anticipated.

**Sheffield Council** have accepted the following tenders: Tramway tie bars and anchor joints, Bayliss, Jones, and Bayliss, Limited, Dorman, Long and Company, Limited; tramway rails, Steel, Peech and Tozer, Limited; e.h.t. switch gear at Neepsend Station (extension of contract by four additional panels), A. Reyrolle and Company, Limited, Hebburn-on-Tyne, at £2,453.

**The National Rail and Tramway Appliances Company, Limited,** have contracts in hand at the present time for 70 tons of brake blocks for various Government railways. They are also supplying, among other contracts, brake blocks to the Metropolitan Railway, and 7,000 blocks to the London, Brighton, and South Coast Railway.

**Cardiff Council** have accepted the tender of Messrs. Fraser and Chalmers for a turbo-generator for the Roath power-station at £6,345, and the tender of the British Westinghouse Company for a 1,000-KW. rotary converter, for the Hayes sub-station, at £1,955. Mr. A. Ellis, the electrical engineer, recommended the purchase of the 1,000-KW. converter, instead of a 700-KW. plant, as the larger one would ultimately effect a saving in cost and space.

**Glasgow Tramways Committee** have awarded contracts as subjoined: Steel traction poles, Stewarts and Lloyds, Limited; copper collector bushes, General Electric Company, Limited; motor gear cases, Electrical Engineering and Equipment Company, Limited; bastian radiators, Gillespie and Beales; lighting fittings, Falk, Stadelman, and Company, Limited; supplying and fitting up an electric clock at the junction of two roads, W. Silvester and Company.

**The Great Western Railway** have placed an order with the Railway Track Supply Company (of Great Britain), 81, Gracechurch Street, London, E.C., for one Buckwalter electric industrial truck, for use at their Swindon works. This, we believe, is the first truck of its kind ordered for use in Great Britain. The manufacturers of the Buckwalter trucks have standardised four types of trucks for railway platforms, locomotives machine shops, docks, etc. Further particulars can be obtained from the Railway Track Supply Company on application.

**Bradford Corporation** have ordered 20 Dick-Kerr standard 40-H.P. motors, at £104 each, for the tramcars running between Bradford and Leeds. Tenders for supplies to the tramways department have been placed as follow: Tangyes, Limited, armature winding machine, £88, wheel-turning lathe, £808; Leeds Engineering and Hydraulic Company, Limited, two sets hydraulic jacks, £230; J. Keith and Blackman Company, Limited, smiths' hearths (two single and one double), £81; Carrick and Ritchie, travelling crane, £535; F. Parker and Company, Manchester, Beecroft and Wightman, Limited, Bradford, and J. Rhodes and Company, Limited, Bradford, supplies of timber for tramcar bodies.

**London County Council** have entered into contracts as under: Kerrige and Shaw, provision of foundations required in connection with the substitution of turbines for reciprocating engines at Greenwich power-station; British Westinghouse Company, high-tension switch gear, etc., for Greenwich power-station, £17,915; J. Cochrane and Sons, laying condensing water pipes in the bed of the River Thames at Greenwich power-station; Electrical Installations, Limited, wiring of Camberwell and Cressy Road car sheds, £2,146; H. L. Holloway, foundations for rotary converters to be installed at Shoreditch sub-station, and additional workshop accommodation, etc.; British Westinghouse Company, 13 reactance coils and two steel valve chests required in connection with the provision of protective devices for the existing plant at Greenwich power-station, £5,943; Hadfields Steel Foundry Company, special trackwork for junction lines at Tooting Broadway, £1,800; Ashworth, Son, and Company, Dewsbury, 20-ton weigh-bridge for Belvedere Road depot, £136; National Rail and Tramway Appliances Company, five hydraulic pit-jacks, £35 10s. each; Carborundum Company, rail grinding blocks for the next 12 months, 4s. 6d. per block, less 2½ per cent. discount, total amount about £270; J. G. Ingram and Son, repair of 196 india-rubber plough bases burnt, etc., estimated cost £196 13s.; John Brown and Company, 18 tons special hard-rolled steel plates, £219 (approximately); John Brown and Company, 45 bars of insert steel, £192 (approximately); R. R. Todd, High Holborn, 520 copper bonds, £127; Anderston Foundry Company, 200 cast-iron extended arm yokes and 200 cast-iron short yokes, £290 15s.; Brecknell, Munro, and Rogers, 1,500 trolley wheels, £193 15s.; Imperial Light, Limited, Westminster, 36 acetylene lamps, 1,000 c.p., £135; Bayliss, Jones, and Bayliss, 2,000 tie rods for extended yokes, £193. Messrs. Babcock and Wilcox have supplied 5,000 chain stoker links at £18 12s. a thousand, and 5,000 links at £28 a thousand, for use at Greenwich generating station.

**Rejection of the Sydney Underground Scheme.**—On October 14 the Legislative Council rejected the bill, already passed by the House of Assembly, authorising the construction of an underground railway and tramways in Sydney, at an estimated cost of £4,800,000.

**Bournemouth and Investment of Renewals Fund.**—In his report on the tramways undertaking the borough auditor says that when a transfer to renewals fund has been made, it is incumbent upon them, pursuant to the Corporation Act, 1901, to invest such funds in authorised securities. Having regard to this provision the transfer to renewals fund has not, it would seem, been carried out in the manner enjoined by the statute.

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## TRAMWAY AND LIGHT RAILWAY NOTES.

**ABERDEEN.**—Application has been made to the Board of Trade by the Aberdeen Suburban Tramways Company for permission to run trail cars. It has been granted on condition that a loop is provided.

**BOLTON.**—Power to run trail and coupled cars is being applied for by the Corporation. Five tramway extensions are also proposed.

**BOURNEMOUTH.**—The tramways manager has informed the Tramways Committee that he has arranged a simple method for ventilating the cars. As the result of their inspection of two cars so fitted, the Committee have approved the arrangement.

**BRADFORD.**—It is proposed to erect a new and larger district depot at the junction of Bolton and Idle Roads for the tramways department, and to provide additional car accommodation at Thornbury.

**CARDIFF.**—An important section of the tramways, consisting only of single line, is to be doubled. Sir John Courtis, chairman of the Tramways Committee, recently defended the action of the management in undertaking the work in order to relieve congestion and to increase facilities. Sir John added that there were many places in the city where the need exists, and in the course of the discussion it transpired that land is being purchased in order that another length of track may be duplicated.

**GLASGOW.**—The City Council have, by 19 votes to 16 adopted the following motion by Councillor Shedden: "That as a means of solving the question of congestion on the streets, and of giving facilities towards the expansion of the city, the Corporation appoint a special committee to consider and report as to the feasibility of establishing a system of tube electric railways from east to west (say Shettleston to Clydebank), and from north to south (say Bishopbriggs to Rouken Glen)." During the past quarter inspectors in plain clothes have been engaged in travelling on the Glasgow tramcars, with a view to detecting contraventions of the bylaws. Between July 25 and October 11 they noted 223 cases of spitting on cars, and also a large number of cases of children hanging on to the rear of the cars. In all, no fewer than 848 offences of various kinds have been booked.

**GRIMSBY.**—The Tramways Committee have been directed to consider the question of asking the Tramways Company to convert all their open top deck cars into covered tops.

**LEEDS.**—The Leeds Tramways and Electricity Committee propose asking the Board of Trade for sanction to borrow £45,000 for the purpose of providing new tramcars for the city. It is also intended to apply the side life-guard to the whole of the cars.

**LIVERPOOL.**—Reviewing the work of the past year on October 10, Alderman F. Smith, chairman of the Tramways Committee, mentioned that on February 16 they decided to have a sample car built of the new type designed by the general manager, with a separate entrance and exit both from the lower and upper decks. The car was found to be very popular, and the Committee decided to build six more of the same type, two of which were already in the service, and had proved most satisfactory, the remaining four being in course of construction. The Committee on January 17 decided to try experimentally automatic point controllers. Two of these appliances were put into service, and one had proved very satisfactory, whilst the other had not proved quite so satisfactory. The system of collecting the fares from passengers as they entered the cars had been tried experimentally for three months, but at the time of the maximum traffic it was found impossible to carry it out to the full extent. The general manager, however, was of opinion that it was helpful to the conductor to collect as many fares as possible on the platform without causing delay.

**LONDON.**—Motor omnibus competition has awakened the County Council to the need for advertising tramway facilities in relation to the education service. The various steps which have been taken in the matter were reported to the Council on October 14, when, on the recommendation of the Highways Committee, the Council rescinded the resolution passed on July 8, authorising the invitation of tenders for the provision of illuminated signs in connection with the advertising of tramway service on tramway buildings and other sites. At the same meeting Mr. G. H. Hume, on behalf of the Highways Committee, said that the Council were at present operating eight trail cars. The results had been satisfactory. The certificate of the Board of Trade was only provisional; when the final certificate was received the extension of the trail car system would be fully dealt with. Applications for increased pay by mechanicians in the tramway workshops and by car washers have been referred to the Conciliation Board. The washers have asked for an increase of 3s. a week. There are at present 735 regular washers and 115 spare washers. The rate of pay commences at 27s. 6d. a week, rising to 30s. Spare washers are paid 4s. 7d. a night. On October 21, the Highways Committee recommended that the pay of regulators and inspectors be increased from £2 2s. to £2 5s. a week, at an estimated cost of £250 a year. A report was presented on October 21 stating that the institution in July, 1912, of 3d. single and 5d. return fares for maximum distances, and of return tickets at reduced fares between intermediate points, had resulted in a marked increase in the number of passengers.


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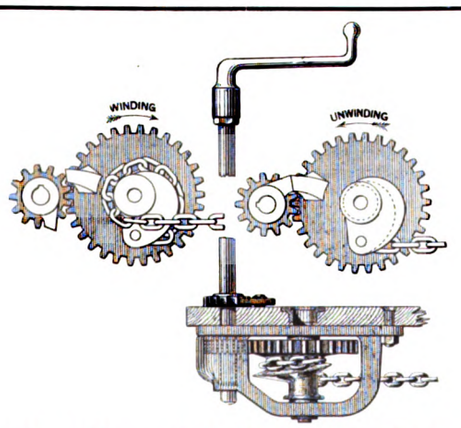


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J. McI. Cater, Manager,
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Dear Mr. Cater:

It affords me pleasure and is only fair to inform you that the Peacock Improved Brake, shipped by you from England last Fall, was tested under the supervision of the Public Service Commission of this State, and was awarded the highest percentage for efficiency over all other hand-geared brakes - and, rest assured; they were all there. The outcome of this test resulted in the National Brake Co., of Buffalo, N. Y., immediately purchasing the rights from me to manufacture and sell the Peacock Improved Brake in the United States.

We have thus far only shown it to the companies mentioned below who have purchased the following number of brakes within the last ninety days.

| | |
|---|---|
| The Brooklyn Rapid Transit Co. | 4036 |
| Second Avenue Railway Co. | 550 |
| New York Street Railways Co. | 440 |
| Third Avenue Railway Co. | 102 |
| Belt Line Railway Co. | 80 |
| Manhattan & Queens | 50 |
| Total Number Brakes Sold | 5258 |

To my mind your success in Europe, and the initial sales in the United States, speak well for the future of the Peacock Improved Brake.

Yours sincerely,

The "PEACOCK" BRAKE CO., 27, Clements Lane, LONDON, E.C.


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**NORWICH.**—A portion of the track is being doubled, and the general situation has been reviewed as regards the lay-out in connection with the renewal of points and crossings. Mr. F. W. Ketley, the manager and engineer to the Tramways Company, states that this is necessary for the purpose of meeting the altered traffic conditions brought about by motor traffic. He has further stated that at the present rate of increase of speed effected by mechanical traction, the tramcar will soon be among the slowest unless powers for speeding up are granted.

**SHEFFIELD.**—The Corporation, on October 22, adopted on the recommendation of the Tramways Committee, a report from the general manager advising that time-and-a-half rate of pay be given for all Sunday work to all employees who had completed five years' service who were not at present in receipt of time-and-a-half or a higher rate for such work. All employees now get time-and-a-quarter, which was granted in July, 1906, at a cost of £2,028 per annum. The new concession would cost £540 a year, and Mr. Fearnley stated that if it was granted a number of applications which he had received for increases in wages might be considered disposed of. This action disposes of the differences between the employees and the Tramways Committee, which were to have been submitted to arbitration.

**SOUTHPORT.**—The Tramways Committee have directed two members and the manager to investigate the question of running cars on the trackless trolley system, as authorised by the new local Act, and to see Mr. J. B. Hamilton, and report to the Committee.

**STOKE.**—The Potteries Electric Traction Company have decided to place time indicators at the Trent Vale and Dresden termini, but have informed Stoke Council that they are unable to install illuminated route indicators. The company, however, are experimenting with a device which they hope will meet the situation.

## PATENT LIST.

**Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.**

*** If the inventions have been communicated the names of the communicators are given below in italics

### APPLICATIONS.

Applications for Letters Patent have been filed:

21,880 Signalling on railways—T A Holroyd and W. H. Holroyd.
22,007 Switches and points for tramways and railways—H. Mozley, F. S. Whitaker, and F. Bland.
22,020 Brake mechanism—F. H. Royce and Rolls-Royce, Limited.
22,029 Railway signalling systems—Soc. Anon., Westinghouse.
22,047 Keys for securing rails to chairs—R. D. Hughes, D. Hughes, and W. Davies.
22,062 Automatic device for stopping trains—A. W. Reader.
22,082 Railway safe-running devices—A. R. Angus.
22,084 Railway signalling—A. H. Farman and F. H. Bassano.
22,123 Railway signalling apparatus—H. L. Vahey.
22,127 Switches for railways—Soc. d'Electricité Mors.
22,184 Mechanical device for automatically stopping trains on passing signals at danger—W. Seward and C. E. Morgan.
22,224 Electro-pneumatic air-brake systems — British Thomson-Houston Company, Limited (*General Electric Company*).
22,264 Railway signalling apparatus—H. Fanton.
22,266 Method of controlling and regulating trains—T. Barbour and W. S. Suffern.
22,276 Tramcars—G. Ashton.
22,292 Revolving and self-adjusting splash-guard for motor omnibuses—M. B. Jack.
22,371 Emergency control of railway trains—J. P. Ross and A. E. Wishart.
22,378 Automatic mechanical control for trains disregarding signals—C. R. Shrewsbury.
22,386 Signalling and controlling locomotives—J. Partington.
22,397 Train control apparatus—C. H. Dent.
22,453 Outside seats for motor omnibuses—E. Zepler and T. H. Sutton.
22,535 Railway rails—J. R. Calder and O. D. Peat.
22,563 Signal for railways—A. Moore-Parsons and C. W. Codd
22,583 Generation of electrical power; the electro-mechanical propulsion of railway and tramway vehicles, etc.—W. P. Durtnall and A. H. Binyon.
22,609 Means for supporting tramway rails—J. Robbins
22,643 Safety controlling devices for railways—E. Browning.
22,660 Railway spikes or railway spiral chair-spike E. Butterfield (*P. F. Butterfield*).
22,701 Railroad ties and beds M. W. Tebyrica.
22,829 Signalling and controlling devices—D. A. Cooper.
22,846 Signalling apparatus—F. S. Bolam.
22,867 Signalling apparatus—R. Capstick, W. Dawson, and A. W. Whelon.
22,950 Device for stopping a passenger train that has passed a signal at danger—W. J. Owen and C. L. Mason.
22,951 Motor omnibuses—C. Mears.
23,197 Covering for outside seats of motor omnibuses—F. B Topfield.
23,205 Railway signalling—T. Evans, D. J. Evans, and S. Watkinson.
23,264 Life-guards for motor omnibuses—P. C. Sarapata.
23,428 Railway signalling apparatus—J. W. Milne.
23,478 Electrical signalling apparatus—G. Dearle.
23,520 Railway signalling apparatus—A. W. Fisher.
23,523 Guard for tramcars—K. Krienitz.
23,545 Means for preventing side-slipping of motor omnibuses—F. Anderson.
23,640 Electric signalling systems for railways—T. D. Parr.
23,671 Railway signalling apparatus—S. Falls.
23,672 Railway signalling apparatus—F J. Wellisch and F. Titterton.
23,673 Rail joint—J. B. Murphy.
23,674 Guard for tramcars, etc.—J. B. Murphy.
23,797 Device for signalling and braking railway trains—B. Williams.
23,801 Safety device for use with railway signals—A. Krall.
23,824 Railway signalling control—H. Lewis, L. A. Robinson, and G. A. Youngman.
23,869 Rail joints—A. W. R. Beaney.
23,876 Automatic brake appliances to prevent train equipped with vacuum brake from passing signal at danger—J. Jewell and J. Anderson.
23,877 Seats for tramcars—E. S. Rayner.
23,894 Automatic danger signal for railways—J. Bassett.
23,926 Life-guard for motor and tramway vehicles—J. R. Togna.
23,943 Chairs for rail joints—G. Turton, Platts and Company, Limited, and H. Liddell.
23,976 Automatic electrical signalling for railway trains—W. Hiley.
23,978 Safety railway appliances—C. Gregory and T. Gordon.
23,996 Devices for stopping railway trains—A. G. Garden.
24,005 Tram passenger register—E. Priestman.
24,030 Controlling and signalling apparatus for use on railways—J. J. Daniels.
24,062 Brakes for tramway and railway vehicles—E. Hatton.
24,067 Vacuum brake apparatus—E. S. Luard.
24,113 Trains—Oesterreichische Daimler Motoren Akt.-Ges., and H. Reik.
24,178 Railway signalling apparatus—G. Grey.
24,193 Signalling and interlocking for railways and tramways—McKenzie and Holland, Limited, and C. H. W. Edmonds.
24,208 Guard rail attachment for permanent ways—C. Pasel.
24,263 Automatic signalling apparatus for railways—G. Higginbotham.
24,275 Trolley pointer guide for electric tramcars—G. F. Wrench.
24,361 Railway sleepers—E. T. d'Cunha.
24,408 Brake apparatus—W. H. Rymer.
24,441 Electric signalling apparatus for railways—F. Mackintosh.
24,444 Train signalling systems—B. Starie.
24,511 Railway signalling apparatus—S. Wormald and W. Stead.

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AILSA OILSKINS with Padded Scyes and Protected Sleeves. Send for sample of our latest improved pattern. AILSA OILSKIN CO. *Manufacturers.* Dairy, near Glasgow.
FOR MOTORMEN.
*Extracts from Users' Letters:*
"Ailsa Coats are best and cheapest we have ever had."
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"The oilskin coats we now use are entirely confined to the 'Ailsa' manufacture."
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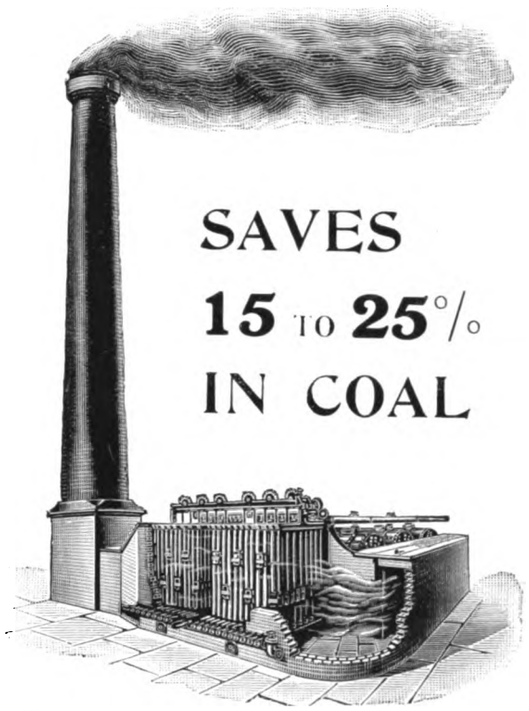
# GREEN'S ECONOMISER



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24,600 Rails and chairs for railway lines—E. M. Bourke and A. M. Bourke.
24,798 Apparatus for regulating and checking omnibus and tram tickets—F. L. Hancock.
24,863 Securing better adhesion between locomotive wheels and rails at starting—F. J. Hookham.
24,885 Signalling apparatus on railways—J. T. Ripley.
24,921 Rail joints—J. Reinhart.
24,937 Railway vehicles and attachments thereto for the prevention of telescoping—J. B. Willis.
24,940 Railway switches or points—L. W. Williams.

## Specifications Published.

1912.

21,087 Brakes—Mark (*Rotary Air Brake Company*).
24,740 Rail sleepers—Caron.
29,904 Spring check rails for railway vehicles—Williams, Williams, and Williams.
21,601 Apparatus for checking the fares of persons travelling by omnibuses, trams, etc.—Ottino.
21,710 Railway and road passenger vehicles—International P-A-Y-E Tramcar Company, Paul and Tanner.
25,194 Device for attachment to the wheels and axles of motor omnibuses, for preventing the splashing of mud and water—Cooper and Cooper.
21,488 Metal railway sleepers—Willis (*Newcomb*).
21,784 Seats for tram-cars, etc.—Brown.
22,139 Instrument for registering the profile of the head of a rail on tramway or railway tracks—Morris.
25,333 Railway signalling apparatus—Handcock, Dykes, and Duddell.
25,970 Apparatus for securing in place or removing the wearing portions of compound tram rails—Noll.
14,846 Means for automatically equalising the load on electric tramways or railways—Bergman.
17,476 Omnibuses—London General Omnibus Company, Rackham, O'Neill, Messervy, and Iden.
19,952 Brake blocks—Frood.
21,983 Power transmission and propulsion for self-propelled vehicles and locomotives—Marshall.
22,833 Electric signalling systems for railways—Ward.
23,639 Trolley poles for tramcars—McQuade.
24,522 Clips for anchoring electric trolley wires for tramways—Welsh.

1913.

6,185 Block-signalling and train-controlling systems—Allard.
8,266 Joints for railway rails—Ledoux.
14,012 Method for forming parallel faces on the ends of rails to be butt-welded—Th. Goldschmidt Akt.-Ges.
2,112 Compound rails for railways and tramways—Rhodes.
2,676 Rail joints—Buster.
4,047 Rail joints—Young.
9,030 Securing of railway rails to sleepers—Schisler.
9,475 Rail joints—Imray (*National Malleable Castings Company*).
11,353 Car couplers—Imray (*National Malleable Castings Company*).
16,076 Top-deck seating arrangements for motor omnibuses—Hickman.

# TRAFFIC RETURNS.

## Colonial and Foreign Tramways.

| NAME OF COMPANY. | 1912. WEEKS ENDING. | | | | | 1913. WEEKS ENDING. | | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct. 5. | Oct. 12. | Oct. 19. | Oct. 26. | Nov. 2. | Oct. 4. | Oct. 11. | Oct. 18. | Oct. 25. | Nov. 1. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Anglo-Argentine ... ... ... | 55.231 | 54.605 | 53.635 | 54.912 | 50.805 | 56.823 | 52.547 | 57.311 | 54.630 | 59.167 | 44 | 2.436.198 | +190.217 |
| Auckland ... ... (28 days) | 18.498 | ... | ... | ... | ... | 19.943 | ... | ... | ... | ... | 12½ | 61.553 | + 2.595 |
| Brazilian Street ... (month) Mlrs. | 42.082 | ... | ... | ... | ... | 50.952 | ... | ... | ... | ... | 9 | 101.353 | + 18.853 |
| Brazilian Traction ... ... ... | 83.156 | 81.994 | 80.793 | 82.879 | 85.839 | 94.441 | 95.021 | 94.284 | 92.207 | 90.398 | 44 | 3.955.511 | + 68.966 |
| Brisbane ... ... ...(month) | 22.700 | ... | ... | ... | ... | 25.590 | ... | ... | ... | ... | 39 | 232.768 | + 51.674 |
| British Columbia ... (month) $ | 688.069 | ... | ... | ... | ... | 734.283 | ... | ... | ... | ... | 13 | 2.260.854 | +247.268 |
| Buenos Aires Port and City (month) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Buenos Ayres Lacroze ...(month) | 43.363 | ... | ... | ... | ... | 44.261 | ... | ... | ... | ... | 13 | 133.945 | + 6.907 |
| Calcutta ... ... ... Rs. | 67.896 | 68.914 | 71.784 | 55.874 | 56.008 | 73.068 | 69.438 | 53.404 | 59.024 | 57.802 | 44 | 28.29.928 | +1.32.819 |
| Cape Town ... ...(month) | ... | ... | ... | ... | ... | 11.290 | ... | ... | ... | ... | — | — | — |
| Carthagena and Herrerias (month) | 2.932 | ... | ... | ... | ... | 1.344 | ... | ... | ... | ... | 39 | 24.661 | + 5.395 |
| Cordoba ... ... ...(month) | 11.745 | ... | ... | ... | ... | 13.356 | ... | ... | ... | ... | 26 | 80.725 | + 8.456 |
| East India (Simplex petrol) (month) | 1.931 | ... | ... | ... | ... | 2.028 | ... | ... | ... | ... | 9 | 4.033 | + 180 |
| Kalgoorlie ... ...(month) | 3.251 | .. | ... | ... | ... | 3.068 | ... | ... | ... | ... | 39 | 26.447 | − 2.341 |
| La Plata ... ... ...(month) | 4.153 | ... | ... | ... | ... | 4.528 | ... | ... | ... | ... | 39 | 45.511 | + 9.415 |
| Lima ... ... ...(month) | 22.660 | ... | ... | ... | ... | 34.110 | ... | ... | ... | ... | 39 | 300.647 | + 23.783 |
| Madras ... ... ... Rs. | (2 weeks) 25.377 | ... | (2 weeks) | 24.103 | | (2 weeks) 26.161 | ... | (2 weeks) | 26.389 | | 44 | 5.36.733 | + 38.117 |
| Melbourne ... ...(month) | 59.500 | ... | ... | ... | ... | 62.000 | ... | ... | ... | ... | — | — | — |
| Mexico ... ... (month) $ | 587.734 | ... | ... | ... | ... | 604.744 | ... | ... | ... | ... | 39 | 5.116.331 | +107.899 |
| Montevideo ... ...(month) | 27.711 | ... | ... | ... | ... | 27.870 | ... | ... | ... | ... | 48 | 344.301 | + 26.483 |
| Para ... ... ... .. | 4.045 | 4.728 | 4.720 | 4.910 | 4.477 | 3.845 | 4.490 | 4.212 | 4.318 | 3.897 | 48 | 192.339 | − 1.131 |
| Port Elizabeth ... ...(month) | 2.914 | ... | ... | ... | ... | 3.071 | ... | ... | ... | ... | — | — | — |
| Shanghai ... ... ... $ | 22.239 | 21.725 | 22.199 | 20.785 | 20.486 | 25.200 | 26.000 | 26.400 | 25.200 | 24.400 | 43 | 960.852 | +112.247 |
| Singapore ... ... ... $ | 10.198 | 11.220 | 10.456 | 10.045 | 9.981 | 12.241 | 13.404 | 13.071 | 11.593 | 11.265 | 44 | 525.754 | + 68.599 |
| Toronto ... ... (month) $ | 767.944 | ... | ... | ... | ... | 865.796 | ... | ... | ... | ... | 39 | 7.183.470 | +962.429 |
| Winnipeg ... ... (month) $ | 3,309.722 | ... | ... | ... | ... | 331.732 | ... | ... | ... | ... | 39 | 2.981.434 | +243.882 |

*(Continued on page 440.)*

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# TRAFFIC RETURNS—*continued.*

## Tramways and Omnibus Undertakings in the United Kingdom.

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | | 1913. WEEKS ENDING. | | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct. 5. | Oct. 12. | Oct. 19. | Oct. 26. | Nov. 2. | Oct. 4. | Oct. 11. | Oct. 18. | Oct. 25. | Nov. 1. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Aberdeen Corporation ... ... | 1,480 | 1,483 | 1,365 | 1,363 | 1,407 | 1,608 | 1,636 | 1,505 | 1,453 | 1,434 | 22 | 37,093 | + 2,409 |
| Accrington Corporation ... | .. | 591 | 576 | 539 | 535 | ... | 520 | 561 | 606 | 580 | 20 | 17,579 | + 1,655 |
| Ayr Corporation ... ... ... | 271 | 223 | 210 | 195 | 193 | 367 | 262 | 256 | 254 | 254 | 24 | 11,272 | + 1,556 |
| Bath Electric ... ... ... | 899 | 853 | 824 | 751 | 736 | 1,061 | 916 | 869 | 898 | 799 | 44 | 43,156 | + 3,410 |
| Birkenhead Corporation ... ... | 1,165 | 1,167 | 1,163 | 1,112 | 1,268 | 1,278 | 1,245 | 1,292 | 1,187 | 1,431 | 31 | 40,450 | + 4,013 |
| Birmingham Corporation ... ... | 11,120 | 10,944 | 11,073 | 10,636 | 11,092 | 12,775 | 12,275 | 12,450 | 12,398 | 12,486 | 31 | 361,572 | + 30,896 |
| Blackburn Corporation ... ... | 1,181 | 1,189 | 1,324 | 1,123 | 1,163 | 1,390 | 1,331 | 1,259 | 1,457 | 1,319 | 31 | 41,841 | + 4,073 |
| Blackpool and Fleetwood ... ... | 743 | 580 | 401 | 321 | ... | 1,030 | 612 | 626 | 467 | ... | 17 | 27,482 | + 4,607 |
| Blackpool Corporation ... ... | 1,775 | 1,016 | 820 | 571 | 649 | 2,527 | 1,291 | 1,035 | 941 | 700 | 30 | 71,692 | + 11,539 |
| Bolton Corporation ... ... | 2,581 | 2,634 | 2,558 | 2,467 | 2,570 | 2,791 | 2,748 | 2,854 | 2,606 | 2,790 | 31 | 85,660 | + 5,099 |
| Bournemouth Corporation ... | 1,767 | 1,679 | 1,562 | 1,566 | 1,620 | 2,009 | 1,935 | 1,834 | 1,785 | 1,794 | 31 | 70,649 | + 8,404 |
| Bradford Corporation ... ... | 5,497 | 5,790 | 6,001 | 5,024 | 5,494 | 6,136 | 5,797 | 6,170 | 5,974 | 6,067 | 31 | 186,387 | + 11,899 |
| Brighton Corporation ... ... | 995 | 982 | 926 | 856 | 869 | 1,134 | 1,047 | 1,056 | 946 | 943 | 31 | 37,070 | + 2,583 |
| Bristol ... ... ... ... | 7,674 | 7,024 | 6,802 | 6,823 | 6,956 | 8,630 | 7,760 | 7,892 | 7,457 | 7,602 | 43 | 352,608 | + 48,033 |
| British Electrical Federation ... | 39,530 | 38,426 | 38,370 | 37,822 | 37,740 | 56,536 | 51,928 | 52,493 | 52,204 | 50,941 | — | — | — |
| Burnley Corporation ... ... | 1,660 | 1,678 | 1,552 | 1,437 | 1,503 | 1,781 | 1,804 | 1,737 | 1,676 | 1,739 | 31 | 53,703 | + 6,531 |
| Burton-on-Trent Corporation ... | 294 | 273 | 270 | 266 | 266 | 296 | 333 | 288 | 272 | 280 | 31 | 9,139 | + 436 |
| Bury Corporation ... ... ... | 1,287 | 1,354 | 1,268 | 1,222 | 1,246 | 1,316 | 1,378 | 1,386 | 1,324 | 1,350 | 32 | 42,687 | + 1,769 |
| Cardiff Corporation ... ... | 2,565 | 2,440 | 2,424 | .. | ... | 2,785 | 2,689 | 2,648 | ... | ... | 29 | 80,595 | + 8,850 |
| Chatham and District ... ... | 959 | 906 | 901 | 829 | 829 | 1,078 | 1,012 | 952 | 941 | 894 | 43 | 40,469 | + 2,568 |
| Chesterfield Corporation ... ... | 228 | 228 | 236 | 235 | ... | 269 | 261 | 263 | 256 | ... | 29 | 7,716 | + 955 |
| Colne and Trawden ... ... | 248 | 292 | 269 | 244 | 257 | 284 | 252 | 283 | 267 | 270 | 44 | 12,148 | + 772 |
| Cork Electric ... ... ... | 480 | 484 | 469 | 453 | 459 | 557 | 519 | 510 | 479 | 499 | 43 | 21,853 | + 570 |
| Croydon Corporation ... ... | 1,793 | 1,781 | 1,758 | 1,718 | ... | 1,817 | 1,627 | 1,616 | 1,603 | ... | 29 | 49,998 | — 5,193 |
| Darlington Corporation ... ... | 226 | 227 | 229 | 228 | 222 | 255 | 254 | 245 | 246 | 249 | 31 | 7,786 | + 779 |
| Derby Corporation ... ... | 875 | 910 | 894 | 870 | 875 | 1,042 | 1,001 | 971 | 963 | 921 | 31 | 30,921 | + 3,257 |
| Dover Corporation ... ... | 246 | 234 | 230 | 214 | 211 | 285 | 247 | 239 | 227 | 224 | 31 | 8,296 | + 175 |
| Dublin and Lucan ... ... | 158 | 152 | 131 | 116 | 132 | 141 | 109 | 123 | 110 | 117 | 17½ | 2,789 | — 24 |
| Dublin United ... ... ... | 5,689 | 5,966 | 5,682 | 5,334 | 5,445 | 3,794 | 3,707 | 4,158 | 4,329 | 4,727 | 43 | 241,103 | — 13,429 |
| Dundee City ... ... ... | 1,260 | 1,285 | 1,176 | 1,165 | 1,203 | 1,380 | 1,390 | 1,292 | 1,278 | 1,261 | 24 | 31,980 | + 2,407 |
| East Ham Corporation ... ... | 1,037 | 1,027 | 1,055 | 1,053 | 1,086 | 982 | 999 | 973 | 959 | 946 | 31 | 31,676 | — 1,603 |
| Exeter Corporation ... ... | 323 | 337 | 325 | 294 | 299 | 377 | 346 | 342 | 336 | 332 | 31 | 11,121 | + 556 |
| Gearless Motor Buses ... ... | ... | ... | ... | ... | ... | 647 | 579 | 636 | 595 | 488 | 30 | 15,034 | — |
| Glasgow Corporation ... ... | 19,063 | 20,081 | 19,514 | 18,917 | 19,147 | 21,881 | 21,009 | 21,312 | 21,041 | 21,097 | 22 | 445,508 | + 32,977 |
| Glossop (Urban Elec. Supply Co.)... | 123 | 130 | 130 | 118 | 124 | 139 | 130 | 136 | 126 | 129 | 44 | 5,737 | + 596 |
| Halifax Corporation ... ... | 1,957 | 1,976 | 2,012 | 1,911 | 1,776 | 2,209 | 2,019 | 2,073 | 2,219 | 2,026 | 30 | 65,922 | + 2,070 |
| Hastings and District ... ... | 983 | 986 | 932 | 834 | 793 | 1,216 | 989 | 1,010 | 911 | 882 | 44 | 46,967 | + 3,454 |
| Huddersfield Corporation ... ... | 1,991 | 2,012 | 2,031 | 1,806 | 1,950 | 2,219 | 2,079 | 2,151 | 2,114 | 2,099 | 31 | 66,861 | + 4,381 |
| Hull Corporation ... ... ... | 2,990 | 3,674 | 3,711 | 2,950 | 3,034 | 3,211 | 3,866 | 4,420 | 3,160 | 3,182 | 31 | 97,286 | + 5,422 |
| Ilford U.D. Council ... ... | 418 | 397 | 389 | 374 | 388 | 458 | 440 | 439 | 442 | 433 | 31 | 14,143 | - 1,259 |
| Ilkeston Corporation ... .. | 116 | 117 | 159 | 114 | 110 | 137 | 132 | 179 | 123 | 127 | 32 | 4,309 | + 698 |
| Ipswich Corporation ... ... | 448 | 412 | 400 | 380 | 395 | 505 | 444 | 428 | 423 | 411 | 31 | 15,107 | + 615 |
| Isle of Thanet ... ... ... | 372 | 471 | 413 | 342 | 337 | 376 | 496 | 494 | 408 | 390 | 5 | 2,163 | + 228 |
| Kilmarnock Corporation ... ... | 165 | 158 | 163 | 162 | 154 | 180 | 164 | 169 | 175 | 170 | 24 | 4,390 | + 308 |
| Lanarkshire ... ... ... | 1,649 | 1,612 | 1,589 | 1,622 | 1,596 | 2,117 | 1,870 | 1,855 | 2,057 | 1,924 | 43 | 73,946 | + 9,342 |
| Lancashire United ... ... | 1,425 | 1,390 | 1,440 | 1,342 | 1,289 | 1,791 | 1,650 | 1,647 | 1,698 | 1,566 | 43 | 67,322 | + 8,054 |
| Leeds City ... ... ... | 7,967 | 7,790 | 7,927 | 7,402 | 7,972 | 8,778 | 8,167 | 8,313 | 8,169 | 8,209 | 31 | 258,787 | + 16,984 |
| Leicester Corporation ... ... | 2,575 | 2,746 | 2,671 | 2,582 | 2,601 | 2,956 | 3,039 | 2,882 | 2,837 | 2,777 | 44 | 123,316 | + 11,500 |
| Leith Corporation... ... ... | 651 | 687 | 625 | 618 | 612 | 755 | 697 | 687 | 674 | 686 | 24 | 17,876 | + 804 |
| Leyton U. D. Council ... ... | ... | 1,279 | 1,224 | 1,291 | ... | ... | 1,343 | 1,300 | 1,322 | ... | 29½ | 40,515 | - 591 |
| Liverpool Corporation ... ... | 12,262 | 11,982 | 12,221 | 11,654 | 12,171 | 13,457 | 12,941 | 13,435 | 12,742 | 13,026 | 43½ | 265,361 | + 43,113 |
| Llandudno and Colwyn Bay ... | 267 | 230 | 203 | 181 | 158 | 292 | 246 | 213 | 195 | 178 | 48 | 17,049 | + 1,453 |
| London County Council ... ... | 42,058 | 40,959 | 40,862 | 41,737 | 41,243 | 43,851 | 43,145 | 42,858 | 43,378 | 41,639 | 30 | 1,277,144 | - 6,101 |
| London General Omnibus... ... | 56,789 | 56,270 | 59,644 | 55,229 | 56,999 | 67,013 | 59,653 | 66,349 | 61,329 | 58,728 | 44 | 2,736,305 | +496,176 |
| London United ... ... ... | 6,058 | 5,871 | 5,823 | 5,709 | 5,568 | 7,005 | 6,215 | 6,156 | 6,194 | 5,841 | 44 | 278,508 | + 4,845 |
| Lowestoft Corporation ... ... | 193 | 189 | 190 | 175 | 183 | 219 | 203 | 204 | 197 | 203 | 4 | 933 | + 57 |
| Maidstone Corporation ... ... | 239 | 187 | 198 | 179 | 171 | 277 | 227 | 203 | 216 | 187 | 31 | 6,595 | + 412 |
| Manchester Corporation ... ... | 17,101 | 16,991 | 17,103 | 16,130 | 16,975 | 18,428 | 17,591 | 18,032 | 17,673 | 17,752 | 31 | 548,093 | + 28,284 |
| Metro. Electric Tramways ... | 8,778 | 8,451 | 8,377 | 8,589 | 8,396 | 10,002 | 9,056 | 9,022 | 9,181 | 8,797 | 44 | 398,038 | + 13,304 |
| Nelson Corporation ... ... | 175 | 201 | 203 | 198 | 187 | 204 | 194 | 206 | 206 | 201 | 31 | 6,661 | + 401 |
| Newcastle-on-Tyne Corporation ... | 4,476 | 4,444 | 4,535 | 4,772 | 4,495 | 5,077 | 5,090 | 5,005 | 5,441 | 4,999 | 31 | 150,910 | + 14,121 |
| Newport (Mon.) Corporation ... | 713 | 697 | 701 | 707 | 705 | 798 | 797 | 783 | 754 | 796 | 31 | 23,964 | + 1,935 |
| New St. Helens and District ... | 733 | 742 | 754 | 711 | 696 | 855 | 807 | 797 | 799 | 749 | 18 | 15,584 | + 1,732 |
| Northampton Corporation... .... | 523 | 523 | 532 | 504 | 507 | 636 | 568 | 547 | 550 | 551 | 31 | 18,263 | + 1,255 |
| Nottingham Corporation ... ... | 3,394 | 3,963 | 3,217 | 3,181 | 3,126 | 3,839 | 4,296 | 3,411 | 3,315 | 3,297 | 30½ | 103,498 | + 4,705 |
| Oldham Corporation ... ... | 2,056 | 2,177 | 2,100 | 2,024 | 2,023 | 2,246 | 2,238 | 2,370 | 2,196 | 2,299 | 32 | 71,205 | - 4,810 |
| Portsmouth Corporation ... ... | 2,068 | 2,029 | 1,936 | 1,725 | 1,856 | 2,408 | 2,168 | 2,199 | 2,085 | 1,982 | 31 | 74,929 | + 4,666 |
| Preston Corporation ... ... | 795 | 791 | 788 | 807 | 772 | 926 | 838 | 873 | 834 | 838 | 32 | 27,616 | + 1,663 |
| Provincial... ... ... ... | 1,784 | 1,829 | 1,728 | 1,609 | 1,621 | 2,052 | 1,835 | 1,908 | 1,741 | 1,706 | 5 | 8,354 | + 577 |
| Reading Corporation ... ... | 714 | 626 | 611 | 590 | 627 | 730 | 709 | 685 | 704 | 683 | 30½ | 21,565 | + 1,544 |
| Rochdale Corporation ... .. | 1,635 | 1,571 | 1,597 | 1,465 | 1,470 | 1,691 | 1,588 | 1,670 | 1,625 | 1,610 | 31 | 50,721 | + 2,138 |
| Rotherham Corporation ... ... | 891 | 916 | 898 | 845 | 998 | 997 | 1,046 | 1,067 | 1,006 | 1,226 | 31 | 31,589 | + 7,652 |
| Salford Corporation ... ... | 4,949 | 5,048 | 4,911 | 4,733 | 4,920 | 5,209 | 5,225 | 5,329 | 5,061 | 5,240 | 31 | 163,619 | + 6,816 |
| Sheffield Corporation ... ... | 6,931 | 7,017 | 6,972 | 6,831 | 6,977 | 7,278 | 7,551 | 7,539 | 7,307 | 7,560 | 32 | 232,872 | + 20,105 |
| Southampton Corporation... ... | 1,311 | 1,195 | 1,145 | 1,123 | 1,142 | 1,502 | 1,402 | 1,303 | 1,261 | 1,215 | 30 | 41,709 | + 2,471 |
| Southend-on-Sea Corporation ... | 756 | 662 | 626 | 606 | 576 | 1,062 | 879 | 841 | 791 | 725 | 31 | 32,420 | + 5,510 |
| South Metro. Tramways ... ... | 835 | 839 | 834 | 782 | 776 | 1,245 | 1,067 | 1,047 | 1,081 | 1,024 | 44 | 40,617 | + 3,304 |
| South Shields Corporation ... | 648 | 635 | 634 | 624 | 601 | 727 | 714 | 699 | 668 | 660 | 31 | 22,760 | + 2,864 |
| Sunderland Corporation ... ... | 1,315 | 1,338 | 1,241 | 1,295 | 1,240 | 1,401 | 1,417 | 1,423 | 1,327 | 1,407 | 31 | 45,825 | + 4,932 |
| Swindon Corporation ... ... | 160 | 158 | 158 | 174 | 157 | 184 | 174 | 166 | 169 | 156 | 30 | 5,180 | + 349 |
| Tramways (M.E.T.) Omnibus Co. ... | ... | ... | ... | ... | ... | 9,610 | 8,289 | 9,162 | 8,953 | 8,616 | 40 | 206,773 | — |
| Tyneside Tramways and Tramroads | 468 | 492 | 476 | 645 | 456 | 531 | 486 | 492 | 717 | 492 | 18 | 9,650 | + 661 |
| Wallasey Corporation ... ... | 1,035 | 1,052 | 1,022 | 972 | 1,029 | 1,233 | 1,129 | 1,199 | 1,134 | 1,125 | 31 | 39,222 | + 3,751 |
| Walsall Corporation ... ... | 592 | 590 | 595 | 561 | 595 | 673 | 626 | 651 | 623 | 643 | 44 | 27,378 | + 1,962 |
| Walthamstow U.D. Council .. | 647 | 606 | 628 | 603 | 623 | 787 | 695 | 711 | 715 | 702 | 31 | 23,595 | + 482 |
| Warrington Corporation ... ... | 431 | 432 | 433 | 430 | 434 | 456 | 454 | 458 | 447 | 442 | 31 | 13,666 | + 461 |
| West Ham Corporation ... ... | 2,628 | 2,498 | 2,439 | 2,599 | 2,504 | 2,837 | 2,739 | 2,691 | 2,713 | 2,648 | 30 | 83,718 | + 2,928 |
| Wigan Corporation ... ... | 1,384 | 1,360 | 1,448 | 1,484 | 1,345 | 1,522 | 1,506 | 1,576 | 1,618 | 1,457 | 30½ | 45,536 | + 4,622 |
| Wolverhampton Corporation ... | 1,012 | 1,080 | 1,021 | 998 | 1,007 | 1,090 | 1,162 | 1,057 | 1,037 | 1,060 | 32 | 34,491 | + 1,970 |
| Yorkshire (West Riding) ... ... | 1,341 | 1,318 | 1,294 | 1,195 | 1,344 | 1,423 | 1,434 | 1,481 | 1,346 | 1,458 | 44 | 63,829 | + 6,843 |

## Electric Railways.

| NAME OF COMPANY. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central London ... ... ... | 5,345 | 5,544 | 5,395 | 5,584 | 5,438 | 4,456 | 5,019 | 5,001 | 5,501 | 5,064 | 44 | 212,340 | + 6,783 |
| City and South London ... ... | 2,965 | 3,199 | 2,918 | 3,226 | 3,023 | 2,544 | 2,897 | 2,655 | 3,067 | 2,666 | 44 | 122,340 | - 11,637 |
| Liverpool Overhead ... ... | 1,559 | 1,586 | 1,595 | 1,541 | 1,598 | 1,712 | 1,643 | 1,705 | 1,645 | 1,725 | 44 | 75,508 | + 5,741 |
| London Electric ... ... ... | 14,020 | 14,380 | 13,950 | 14,435 | 14,150 | 12,810 | 13,715 | 13,485 | 14,245 | 13,690 | 44 | 595,385 | + 810 |
| Mersey ... ... ... ... | 2,326 | 2,321 | 2,300 | 2,355 | 2,312 | 2,328 | 2,318 | 2,292 | 2,318 | 2,228 | 44 | 98,466 | + 4,888 |
| Metropolitan ... ... ... | 16,827 | 17,019 | 16,952 | 16,646 | 16,593 | 17,634 | 17,954 | 18,161 | 18,103 | 17,966 | 44 | 755,245 | + 23,597 |
| Metropolitan District ... ... | 13,370 | 13,402 | 13,241 | 13,228 | 13,292 | 12,820 | 13,107 | 13,266 | 13,462 | 13,023 | 44 | 568,537 | + 17,602 |

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### TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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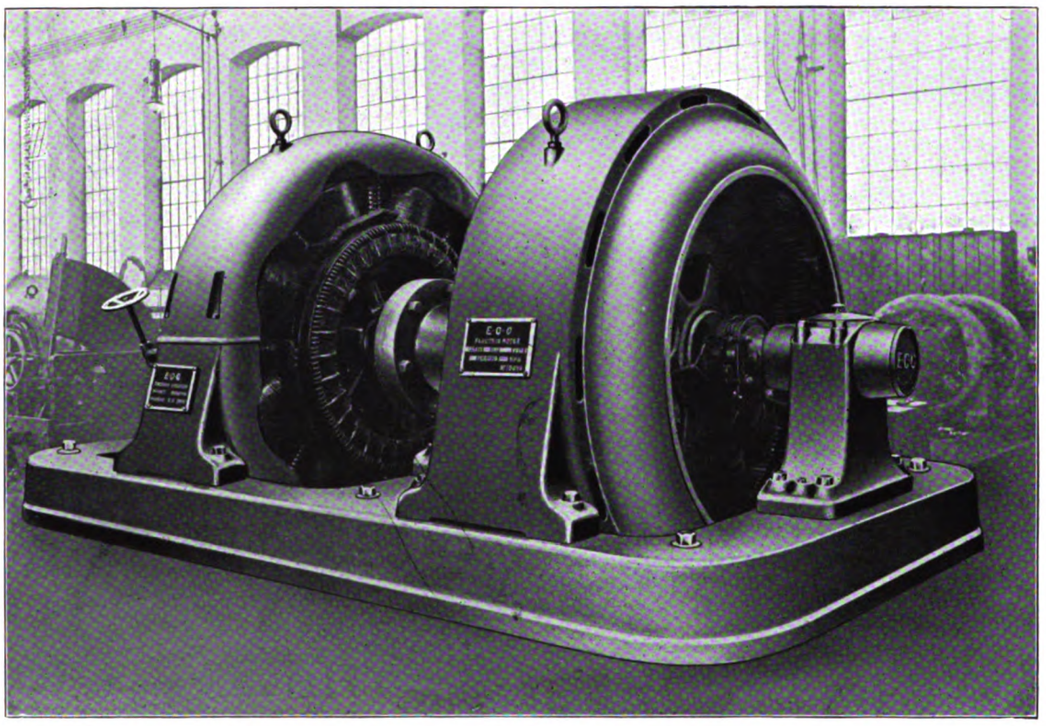

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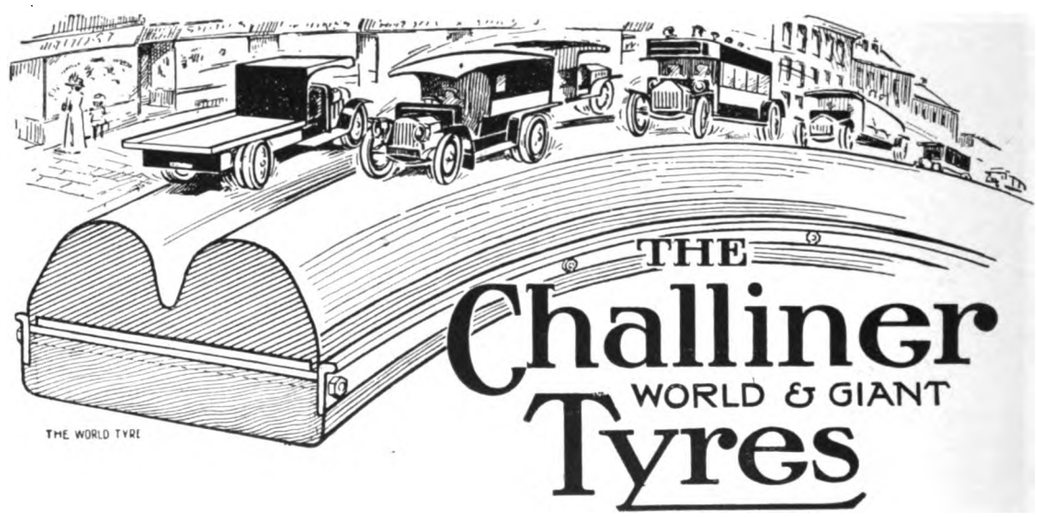


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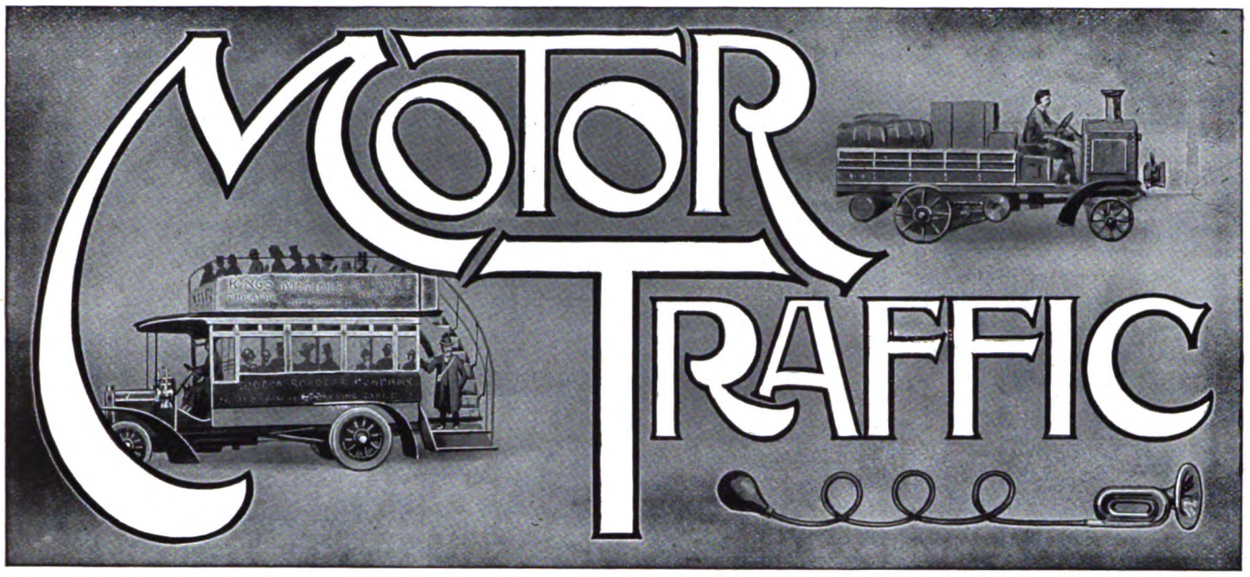


The Royal Automobile Club have declined an invitation to appoint a representative to serve on the committee formed by the Incorporated Municipal Electrical Association for the purpose of considering and adopting such measures as may be found desirable to further the use of the electric battery vehicle. A similar invitation was extended to the Automobile Association and Motor Union, but so far we have not heard of the decision of the latter organisation. If the Royal Automobile Club's determination had been arrived at prior to the formation of the National Council of motor organisations, there would be ground for attributing it to an assumption that the Automobile Association and Motor Union had decided to identify themselves with the Electric Vehicle Committee. For some time after the severance of the Motor Union from the Royal Automobile Club the latter body refused all overtures to work in harmony, but when the Motor Union became amalgamated with the Automobile Association, which even prior to the fusion was the strongest motoring organisation in the United Kingdom, wiser counsels dominated the executive of the Royal Automobile Club. The object of the National Council is to influence legislation, and the title would have been a misnomer without the support of the Automobile Association and Motor Union. The Electric Vehicle Committee's movement is not likely to suffer from the absence of a representative of the Royal Automobile Club, and there is no need for the Incorporated Municipal Electrical Association to spend any time in alleging that the club's refusal constitutes a departure from its chief object, which is the encouragement and development of the motor movement. It is true that the membership is not restricted to petrol car owners; that the rules for certified trials of motor vehicles carried out by the club do not confine such trials to petrol vehicles; and that trials of other than petrol cars have been permitted. Still the committee of the Club would have averted much misunderstanding if, instead of publishing a bare announcement, they had given a reason for their refusal. Doubtless the real ground for standing aloof is to be found in the fact that the Club take no part in any propaganda connected with promoting the sale of any vehicles. A refusal based on this motive would be justifiable. Whether it would be so in the case of the Society of Motor Manufacturers and Traders if they had been invited to assist the committee is another matter; but apparently the manufacturers of storage batteries for vehicles in this country are so few in number that they have not yet become associated with that or any organisation.

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As the electric vehicle industry progresses there should be scope not only for new private and commercial body makers, but for existing petrol chassis manufacturers to cater for the electric vehicle, apart from its batteries. In view of the action of the Society of Motor Manufacturers and Traders in voting a sum of one thousand pounds for the purpose of carrying out alternative fuel trials as the outcome of the Petrol Committee's deliberations, a good case might be made out for the society extending encouragement to the Electric Vehicle Committee. If only for the purpose of providing a substitute to liquid fuels, the work of the Electric Vehicle Committee is deserving of support, for, as Mr. J. S. Critchley remarked in his presidential address at the opening of the winter session of the Institution of Automobile Engineers, the price of petrol has now risen to so high a figure that it seriously handicaps the development of the commercial vehicle. There need be no antagonism between the petrol and electric vehicle, for both have spheres for which the characteristics of one is more fitted than those of the other. This has been discovered in the United States, where the battery car and truck have attained wide popularity. Considerable mischief, however, was occasioned until recently by various types being allotted work for which they were unsuitable, and much money has had to be expended in advertising to remedy the error. Agents in this country should be careful to avoid committing a similar mistake, for users are just beginning to take an interest in the electric vehicle, and unless they are rightly guided the movement may receive a set-back. There could not be a more influential circle of supporters than those who are at the back of the committee, whose chairman is Mr. R. A. Chattock, city electrical engineer of Birmingham, while Mr. F. Ayton, electrical engineer and tramways manager at Ipswich, is the honorary secretary. Both municipally and company-owned electric supply undertakings are uniting in support of the movement, and the scope of the committee's work has been defined on correct lines. As a first step, electric supply authorities are to be impressed with the financial advantages that will accrue to them if they take steps to encourage the use of the vehicle by supplying energy for charging purposes at a reasonable price, to induce hotel proprietors and motor car traders to provide charging facilities, and to impress upon municipal bodies and

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# MOTOR TRAFFIC.

others the advantages attending the use of the electric vehicle. Many other items are included in the published outline of the committee's operations, but none are more important than those that stand second and third upon the list, viz., to decide upon the best arrangements to recommend for charging, and to consider the issue of rules for the proper use and maintenance of the vehicles.

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Considering that it is a burning question in more senses than one, disappointment may be expressed that little or nothing has been done towards carrying out the decision of the Petrol Committee to form a sub-committee for the purpose of testing alternative fuels. A year has elapsed since the matter was referred to the Royal Automobile Club, and the delay would seem to afford ground for the belief that that institution excels in the rôle of the biggest social club in London rather than in the scientific side of motoring. Fortunately another body has come to the rescue in the shape of the Alcohol Fuel Committee, formed as the outcome of the Imperial Motor Transport Conference. That committee will conduct investigations covering the Dominions, the Colonies, and the British Isles, and will also conduct experiments. This announcement has been made by the Hon. Arthur Stanley, M.P., in reply to Mr. Critchley's remarks to the Institution of Automobile Engineers, viz., that the importance of the subject demands the carrying out of complete investigations. In the 40 printed pages comprising his paper, Mr. Critchley fully reviews what has been accomplished as regards alternative fuels in this and other countries, and he justly gives credit to the Motor Union for having first taken up the question in 1906. Then, as now, alcohol was the substitute to which attention was chiefly directed. At the time the recommendations of the Union for the organisation of a competition to decide the merits of alcohol and petrol, and for the selection of the best paraffin carburettors and vaporisers, were apparently shelved by the Royal Automobile Club in a spirit of jealousy. Since then motorists have been indebted to individual effort for what progress has been made in finding substitutes to petrol. While information is being collected as to the resources of the various portions of the Empire in the provision of alcohol from vegetation, no time should be lost before carrying out experiments in the use of that spirit in the propulsion of the several classes of motor vehicle. What is required are immediate researches into the question of the cost of the home product. It is maintained by some authorities that the cost of manufacture in the Colonies would range from fourpence to sixpence per gallon and even less from peat.

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No modern movement affecting both private and public interests has attained a greater degree of publicity than that of public passenger transport by road motor vehicles. In London, for instance, the discussion which has attended its development has probably been greater than was the case when railways displaced the stage coach, for the reason that while only the well-to-do could afford to travel behind a four-in-hand the motor omnibuses, carrying people on pleasure and business trips 20 miles beyond the London boundary, do so in return for a rate of payment which is practically only nominal when compared with the cost of hiring a motor car. Then again the public vehicle, like the car of the private owner until three or four years ago, has to face a storm of discussion anent dust raising and road maintenance. Tar spraying and improved methods of road construction deprived the rural reporter of a small source of income from daily newspapers, but the ratepayers have benefited by reason of the longer wear now given by road surfaces. While the omnibus is passing through the throes of a similar turmoil, the bill of costs presented to the ratepayers for road maintenance is not viewed with favour, but when the transition stage has passed the various main roads will have surfaces of greater strength and of a practically dustless nature, even when wood paving is not utilised. As the new work will be paid for partly by grants from the Road Board and partly by loan, the call upon the ratepayers should not in reality be greater, for the payment is spread over a longer period. The recent agitation on the part of the local authorities of Greater London had a beneficial effect in awakening the Road Board to the needs of the metropolis, and the various Councils should not lose sight of the fact that the Board have been hoarding up a great balance for the expressed purpose of providing work for the unemployed during the winter seasons.

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Hitherto no call has been made on that reserve fund for that purpose, but the indications are that the coming winter will provide the need, apart from the necessity of pushing forward road reconstruction at a faster rate than is now being achieved. The circumstance that the Board and their advisers shared out just under £20,000 in salaries and fees up to May last shows that they are sufficiently well paid to put a little more dispatch into their labours. Probably the future will bring an improvement in this respect, for Mr. H. P. Maybury, the Kent county surveyor, has just been appointed chief engineer to the Board. Mr. Maybury's work in that county during the last nine years of motor traffic has stamped him as the leading road engineer in this country, and it is a matter for regret that he did not enter upon his duties from the position of an advisory engineer until November. The Board has been further strengthened by the appointment of Mr. A. Dryland, county surveyor of Surrey, and Mr. E. P. Hooley, county surveyor of Nottinghamshire, to the Engineering Advisory Committee. After this refitting the Board should be left to pursue the important part which the members have to play in the annals of British road construction, especially as regards laboratory work and the use of trial lengths of various materials. The latter sphere of activity constituted one of the most valuable exhibits brought to the notice of the delegates who attended the recent International Roads Congress and the Imperial Motor Transport Conference. Undoubtedly the Road Board is an improvement on the ordinary Government department, and although some day the organisation may give place to a Central Roads Board the record of the parent body promises to be a most useful one. The members can afford to view with complacency the demand made by the Automobile Association for the Executive Committee of the latter to inquire into the policy of the Board and the manner in which the funds are being administered.

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# MOTOR TRAFFIC.

## THE UPKEEP OF MOTOR VEHICLES.

By C. M. Linley.

Few owners of motor vehicles realise the enormous sums that are wasted through ignorance and carelessness. If I were to say that 75 per cent. of the money spent annually on upkeep is spent unnecessarily, I should be quite safe. It is interesting to watch the despatching of replacement parts from a factory where commercial motors are manufactured. If these parts are examined, it will be seen that a very large proportion of them should never be required had reasonable attention been given to the original part. It is also interesting to watch the records of various users of commercial motors and compare their different expenditure on the same class of vehicles.

I have some figures before me which will show how money can be wasted on upkeep through neglect. Here are two firms using the same make and type of van. A has spent £150 in 16 months, and the car is returned now to the makers for a thorough overhaul. B has had his car two years and six months, and has run 36,000 miles. Apart from tyres his repair cost can be judged from his own words. He says in a letter of August 26, 1913:

> "You will remember I had my car new on Good Friday, 1911, and until about three weeks ago I had not even taken the cylinders down for cleaning, and then I found the only renewal necessary was one big end bearing. The gear box has not been touched, and, in fact, I have not been put to any expense for repairs. As for renewals, I have had one set of tyres, two pairs of shoes for foot brake, one pair of chains, one valve. I attribute this to careful, conscientious, sane driving, and periodical inspection and adjustment. The car has done something like 36,000 miles over various roads."

Neither of these instances are exceptional, and I could fill a whole page of such comparisons. There is no reason to believe that one owner had a better car than the other in the first place, nor is there any reason to believe that one car had a harder duty to perform than the other. An inspection of the two cars made it easy to find the reason for A's large expenditure. The car showed signs of neglect in every detail. Lubricators were missing from many parts. The glass window for observing the flow of oil to the engine was so dirty that it was impossible to tell whether there was any oil in the engine or not. The neglect of this precautionary device had been responsible for all four of the big ends giving out several times. Bolts were missing from a great many parts, and often, where two or more bolts were provided for, only one was in place. Many nuts were only finger tight, allowing movement to take place between parts that should be fixed tightly together. Altogether the machine showed that as long as it would run, nothing was done to it. On the other hand, B's car showed that it was properly looked after. I don't mean that the brass work was highly polished, as this can easily be mistaken for attention. In B's case every lubricator was in its place, and, what is more, they had oil in them. Every nut and bolt was in its place and tight. In all probability A thought that time spent in oiling and adjustment was money wasted, and that he was in pocket by not having it done.

It is difficult to make some owners realise the importance of the stitch in time policy. A stitch in time in commercial vehicles not only saves nine, it sometimes saves nine hundred and ninety-nine. I came upon a typical instance of how the neglect of a small detail may lead to a very heavy expenditure.

A driving chain was allowed to get so loose that it jumped off the sprocket, and in doing so knocked a lubricator off the bearing of the sprocket shaft. The driver did not report this, and the lubricator was not replaced. The driver tried to push grease in with a stick and was quite satisfied with this. Needless to say the grease did not get there, the ball bearing was short of lubrication and seized up, the shaft began to carry the bearing round with it, so that it wore its housing away, and the bearing then got loose on the sprocket shaft and cut a deep groove in the shaft. The wear in the bracket and shaft caused the latter to get out of line with the differential. This caused serious damage to the differential, and the cost of the job, including time and parts renewed, was £40. An expenditure of 15s. would have saved this. There are many causes of neglect; mostly it is caused through the drivers not having sufficient time allowed to go carefully round, greasing and tightening up.

In the majority of cases I have found the drivers willing to take an intelligent interest in their cars if they get the time and have a properly equipped place to do it in. In cases where a number of vehicles are under one roof it is possible to have a proper system of inspection and maintenance. If the lubrication and adjustment is taken out of the drivers' hands, care should be taken that the person to whom it is entrusted is competent, and has sufficient time to do it thoroughly. Strange to say, some of the worst cases I have ever met of neglect have been in vehicles owned by railway and tramway companies.

The motor 'bus is in some cases the cinderella of the tramcar depot. A certain Corporation I have in my mind at one time had 12 tramcars and 9 omnibuses. The cars are in a properly built shed where there is every convenience for their maintenance. Spares of all parts are kept, and all is in proper order. The 'buses are kept in an old cow shed with half the tiles missing from the roof. The floor is earth, and by the time nine 'buses have been washed it is not the best of places in which to do adjustments that require a man to go underneath the chassis.

The equipment consists of one small bench fitted with one old leg vice, without any cut on the jaws, which have been badly strained at some time so that they gape. There were a few old files and other tools lying on the bench, not in a drawer. A man is expected to do all repairs, including engine overhauls, in this place; badly lighted and not warmed. I need hardly say that this Corporation have endless trouble, and that their maintenance costs are enormous. In a properly constructed chassis there should be no very frequent renewals necessary. If they are frequently needed there is something wrong. It may be caused through neglect, or it may be through careless and furious driving.

Having given a typical instance of the cost of cars to different owners, I will now give an instance of how the actual driving on the road, quite apart from any system employed in the maintenance, can affect the upkeep.

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# MOTOR TRAFFIC.

A certain firm of bookbinders have a 3-ton van; it takes a load of books to London every day, and a load of paper back at night, a total distance of 90 miles per day. The van is the property of the firm who made it, and is let to the bookbinding firm.

Once a week it goes to the factory where it was made for all adjustments and renewals. This is included in the contract. The car has been running in this way for four years. During the first two years the cost of upkeep was enormous. Every week some important and expensive part had to be renewed. Often the van had to come in during the week, and sometimes the weekly allowance of time was not enough, and the van had to be kept in for a day or so instead of the half-day as arranged. The driver seemed to be a good, conscientious man, and the trouble was attributed to the roads, or the load, or something that could not be altered. It was, however, always a puzzle to the engineer who had charge of the matter. One day the driver was changed. Like magic the trouble disappeared, and although the van is older and should require more attention, weeks and months and years go by with nothing requiring doing except the ordinary lubrication and adjustments. The journey is the same, the load is the same, everything is the same but the driver.

This again is not a unique case, although it is a very striking one. The speed at which a car is driven has, of course, a lot to do with the cost, but it is not speed alone. High speeds may be indulged in on a good road without much harm. It is speed over bad roads and turning corners fast that does the damage. It is wonderful how a little nursing will prolong the life of every part. The solid tyres used on commercial vehicles do not absorb road shocks to any great extent, and it is therefore much more important that they should be handled with a little reason when roads are bumpy.

## B TYPE CHASSIS FOR THE LONDON ASYLUMS BOARD.

The single-deck omnibus illustrated below is mounted upon a chassis of the well-known B type, which has had such a remarkable record in the service of the London General Omnibus Company. The vehicle, which is stationed at the head ambulance depôt, Fulham, has a seating capacity of 16 passengers, and, as will be seen by the illustration, has the neat appearance associated with the Board's vehicles.

The chassis is of the L.G.O.C. standard type, of which the following is a brief description: Length over all, 19 ft. 2½ in.; width over all, 6 ft. 8¾ in.; wheel base, 12 ft. 10⅜ in.; wheel track, 5 ft. 8 in. The engine is of the 4-cylinder type, with the cylinders cast in pairs, 110 by 140 millimetres, developing about 30 H.P. at 750 revolutions, the valves being arranged on opposite sides. Lubrication is by means of a gear pump to the troughs beneath the big ends. The "Solex" carburettor is fitted, and Bosch high-tension magneto.

B Type Chassis for a London Ambulance.

The cooling arrangements are on the thermo-syphon system, large diameter water pipes being connected with a plain tubular radiator with large cooling surface, and a belt-driven fan working immediately behind it. The clutch is of the leather-faced cone type of simple design, and easily removed or adjusted. The three-speed chain-driven gear box gives speeds of 3·84, 6·65, and 11·98 miles per hour at 750 revolutions of the engine, and a reverse of 3·91 miles per hour.

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# MOTOR TRAFFIC.

The worm-driven back axle, with bevel differential, is so arranged that the complete gear is supported from the top cover of the axle, and is, therefore, capable of being entirely disconnected without removing the road wheels. The two separate brakes are both of the internal expanding type, operated by hand and foot on separate drums on the rear road wheels; a compensating device prevents any braking strains being transmitted through the driving gear.

Solid oak is the material used as the frame of the chassis, with nickel steel flitch plates, and it is of great durability. The cross members are of the same construction, except those for the engine, which are of pressed steel. Both the engine and the gear box are supported direct from the cross members. The cast steel wheels are fitted with Wood-Milne rubber tyres, 900 by 120 millimetres on the front, and 1,000 by 100 millimetres twin on the back. The complete chassis with tyres was supplied by Mr. Stewart A. Curzon, of Victoria Street, Westminster, the body being fitted by the Board's own engineers.

## OMNIBUS COMPETITION AT CAMBRIDGE.

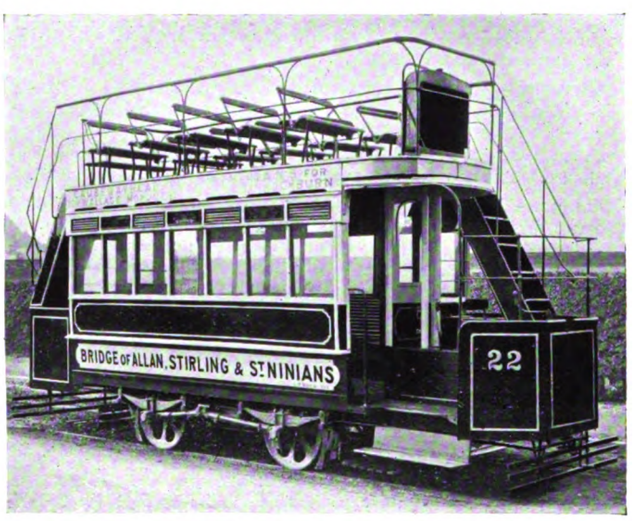
Mr. C. Armstrong, chairman of the Cambridge Street Tramways Company, stated at a meeting of the shareholders on October 21, that the Corporation, having obtained judgment for the amount owing by the company for repairs to the track, were now proposing to apply to the courts for an order to wind up the company. If they forced the company into liquidation they would receive no further contribution, and if they allowed the motor 'bus company to exercise a monopoly the costs of repairs to the roads would be largely increased with no advantage. If the company were met in a reasonable way as regards the upkeep, and the cost of forage was reduced, they could keep the tramways going in spite of the motor 'bus competition. He did not know whether it was too late for the Corporation to consider the suggestion that they should protect the company's routes, and meet the company as regarded the cost of upkeep. Certainly the motor 'bus service was a great acquisition to the town, but the vehicles were responsible for great wear of the roads. The 'bus company paid nothing to the town except for hackney carriage licences. The tramways company had offered to introduce a motor 'bus if the Council would assist them, but the committee did not feel inclined to pledge themselves.

## POST OFFICE MOTOR CONTRACTS.

In their report for the year ended June 30 last, the directors of McNamara and Company state that the accounts show the disastrous change which has come over the fortunes of the company since the commencement of the new Post Office contract for the London mail service. The directors were asked by the Post Office in July, 1911, to tender for a new contract for five years on the basis that about two-thirds of the mileage work be run by motors. In July, 1912, the Post Office motor service was commenced on the new lines, and it was only then that it was possible to realise the onerous conditions of the contract and the impossibility of carrying the service satisfactorily at the prices allowed by the Department. The contract had many exceptional features, which became apparent as time went on, and which distinguished it from other motor mail services, and very largely conduced to the serious loss incurred by the company during the last 12 months. Towards the end of June and July, 1913, it became apparent that it would only be a question of time before the company would be bled to death. Mr. Maxwell Hicks was later appointed the receiver and manager, and subject to the approval of the court, he had entered into a fresh arrangement with the Post Office for the carrying of the London mails previously carried by the company, which arrangement he considered satisfactory for the time being. Should this new contract be continued for a reasonably long period or a modification of the same be entered into by the receiver in December, 1913, the directors hope that they may then be in a position to consider the question of reconstruction of the company. The directors propose to defer calling the usual general meeting of shareholders until the receiver and manager is in a position to inform the board of the prospects of satisfying the debenture holders of the company.

## PETROL CAR FOR BRIDGE OF ALLAN TRAMWAY.

The line of tramway which connects Stirling with Bridge of Allan enjoys the distinction, if such it be, of being the only tramway in Scotland still worked by horses. It is really an interurban line, some three miles in length, and the traffic, except during the summer months, is not heavy. Attempts have been made from time to time to have some improved system of traction installed, but from lack of capital, or from want of a satisfactory arrangement with the local authorities concerned, or other cause, nothing has been done. Meanwhile an interesting experiment has been begun, under which the petrol-driven tramcar comes forward against the motor omnibuses. It is on lines of this sort, where the traffic is light, that the petrol car has a chance of showing what it can do. The line of the Morecambe Tramway Company is an existing case in point.




**Petrol Car for Stirling and Bridge of Allan Tramway.**

The accompanying illustration shows a petrol car which has been designed and constructed by the Lanarkshire Motor Company for the Stirling and Bridge of Allan Tramway Company. In general appearance it does not differ much from a standard four-wheeled car. The engine is a four-cylinder petrol motor developing 25-35 H.P. The shaft works through a three-speed gear box, and the final drive is by chains from a bevel cross shaft to each axle. Axle boxes of the sliding type have not been fitted, as the radius rods can give chain adjustment which cannot be got with the ordinary type of horn blocks. The engine is controlled from either end of the car. The radiator is placed over the canopy at one end of the car. The seating capacity of the car is for 20 passengers inside and 24 on the upper deck.

Major Pringle, of the Board of Trade, inspected the car on October 29, and passed it, subject to one or two slight modifications with respect to life-guards, and the protection of passengers on the upper deck.

ORDERS FOR ELECTRICAL VEHICLES.—Edison Accumulators will deliver early in November an electric tower wagon to the Ilford Council tramways department. It will be placed upon a 1-ton chassis, complete with 60 A 4 cells, having a mileage of 40 miles. At night it will have a lighting equipment of approximately six clusters of three 50 c.p. lamps, and it is furthermore proposed to install a drilling machine for rail drilling. This, it is said, is an advantage which no other type of vehicle at present possesses. Messrs. Libertys have given an order to Edison Accumulators for two more electric vehicles similar to the one they have already in use, namely, ½-ton carrying capacity, complete with 60 cells A 4, 150 ampere-hour, having a mileage of approximately 50 to 55 miles. The mileage of this car per week so far has averaged between 200 and 300 miles, and the total running cost, not including driver, has averaged under 10s. per week. Messrs. Pullers, Limited, have placed an order for a 1-ton van, complete with 60 cells A 6, mileage 50 to 55 miles. This is to be put into extensive trial with a view to their starting a fleet of electric vehicles. Messrs. J. Lyons have also ordered a 2-ton van to carry the equivalent of a double load of their existing pair-horse vans. A 2-ton van with a two-motor direct drive on the back wheels has been purchased by the Stratford Co-operative Society.

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# MOTOR TRAFFIC.

## MUNICIPAL AND COMPANY OMNIBUS PROPOSALS.

CLECKHEATON.—A recommendation is to be submitted to the Council by the Law and Parliamentary Committee is favour of powers being obtained to run motor omnibuses between Cleckheaton and Scholes and Oakenshaw, with extensions later to other parts of the district. The local traction company are credited with the intention of starting a service in the district immediately.

COVENTRY.—The Maudslay Motor Company, Coventry, have been awarded a contract by the Corporation for the supply of six 40-H.P. omnibuses, at £739 each.

CREWE.—The proposal of the Corporation to obtain Parliamentary powers to run motor omnibuses has been rescinded at a special meeting by 25 votes to 8, the question being referred back to the committee for further consideration. This will involve a delay of 12 months in the application to Parliament.

DEWSBURY.—Yorkshire (Woollen District) Tramways Company have ordered three motor omnibuses, to be run experimentally from Dewsbury Market Place to Dewsbury Moor, from Dewsbury Market Place to Shawcross, and between Shepley Bridge, Bradley, and Brighouse. The new services are expected to begin in November.

DUNDEE.—The tramways manager has been directed to obtain estimates for a motor omnibus, which is proposed to be used on the Esplanade during the summer months in order to cope with the overcrowding of tramcars. The vehicle, it is suggested, could also be used to supplement the car service on special routes. Mr. Peter Fisher has stated that he hopes by an alteration of the system of reliefs to do something to lessen the overcrowding difficulty. In regard to a suggestion for adopting the queue system, he states that the police refuse to recognise it.

EDINBURGH.—A conference was held between the Tramways Committee and the Tramways Company for the consideration of routes for the experimental running of motor omnibuses by the company, the vehicles to be purchased by the City Council.

LANCASTER.—Parliamentary powers are to be applied for by the Council for running motor omnibuses within the borough.

LINCOLN.—Councillor Ashley informed the Council at their October meeting that in the matter of running motor omnibuses the Electricity Works Committee had had an application from the British Automobile Traction Company, and that they had come to an agreement with them, but for some reason the company declined to sign the agreement. The Provincial Tramways Company had also applied, but they had offered such conditions that the committee knew the Council would not assent. The committee now proposed to bring facts and figures before the Council in committee and discuss the whole problem.

LIVERPOOL. -Proposals are under consideration by the Tramways Committee for purchasing additional omnibuses in order to extend the services to districts not at present provided with means of locomotion. The type of vehicle in use by the Sheffield Tramways Committee has been inspected at Liverpool and tested on a route which included the Erskine Street hill. Other types of vehicle are also to be inspected.

MANCHESTER.—The Tramways Committee intend to seek powers to run omnibuses along roads outside the city where tramways are either owned or leased by the Corporation, or over which they have running powers

NEWCASTLE-ON-TYNE.—On October 20 the Corporation adopted a recommendation by the Tramways Committee to apply for powers to extend the tramways to Longbenton, outside the city, and to run motor omnibuses in the Longbenton Council's area, which has a population of 16,000. Councillor Rodgers mentioned that the Benton boundary tramway extension increased the receipts by £80 a week, and the Elswick extension to Chillingham Road increased the receipts from £280 to £555 per week. The motor 'buses to Westerhope now carried the population of the village two and a half times a week. So far as Lemington was concerned, they were carrying over 12,000 a week—the population three times over. The Westerhope 'buses were paying, and, moreover, they were feeding the cars to the tune of £20 a week.

NEWPORT.—The Tramways Committee have decided to recommend the Council to apply for powers to run motor omnibuses on nine routes. This decision was arrived at after consideration of a report on additional means of transport in the borough and adjacent districts by Messrs. N. J. Young, general manager of the electricity and tramways department, and A. Nicholls Moore, the electrical engineer. A company has obtained Parliamentary powers for running a system of railless cars in an adjacent area, and Messrs. Young and Moore suggested that the Corporation should maintain the monopoly they now enjoy within their own boundaries, and also advised extension. They pointed out that the motor 'bus had so far found most favour for such work.

READING.—Approval has been given by the Council to recommendations by the Tramways Committee for the promotion of a bill to empower the authority to extend the tramways and to establish railless trolley and motor omnibus services.

TRAFFORD PARK.—At the annual meeting of the Trafford Park Estates Company, near Manchester, a shareholder suggested that motor 'buses should be run in the park. Motor 'buses were running tramcars "off their legs" all over the country. The chairman (Mr. Stevens) said the company had not overlooked this possibility, and hoped in the future to see them when the roads were completed. The company could not be expected to put any capital into them, however. At an earlier stage of the meeting the chairman, in directing attention to the company's investments, said the greatest amongst them was the statutory company owning their railways. They were now earning 3½ per cent. from these railways, but they could never receive a considerable dividend, because it was the essence of their policy that the company did not charge terminals or switching charges, but only the net port railway rates at Manchester Docks, which included a sufficient toll to cover the working expenditure and interest upon the capital.

WARRINGTON.—Consideration is being given by the Tramways Committee to a suggestion made by the Winwick Asylum authorities for the running of a motor omnibus service to Winwick.

WEST BRIDGFORD.—Five omnibuses are to be purchased at a cost of £3,950 by the Urban District Council, the chassis being of Dennis manufacture and the bodies of the Allen type, which was illustrated in THE TRAMWAY AND RAILWAY WORLD of July 10 last. The garage is to cost £1,589, and the service is expected to be inaugurated before Christmas.

WREXHAM.—In order to meet the needs of the district between Chester and Mold the Wrexham and District Electric Tramways Company have decided to run a motor omnibus service.

## "PROVINCIAL GENERAL OMNIBUS COMPANY OF ALL ENGLAND."

SEQUEL TO AN INTERESTING PROJECT.

An action was brought on October 20 in the City of London Court by Mr. C. Chadwell, engineer, of Blackburn, against the General Rapid Transit, Limited, 4, Broad Street Place, E.C., for £38 10s. 5d for professional services rendered. Defendants counterclaimed for £20, money said to have been lent to plaintiff.

For plaintiff it was stated that some years ago he was associated with light railways and tramways in Lancashire with one Lawson. In June last Lawson told plaintiff he was interested in the defendant company, which was bringing out the "Provincial General Omnibus Company of All England, Limited," the object being to establish a motor-omnibus service between various towns in Lancashire and the provinces generally. Lawson thought plaintiff might be of use in obtaining consents of various local authorities in Lancashire, and he was introduced to Mr. Robertson, the managing director, who agreed to give plaintiff £5 a week and out-of-pocket and travelling expenses, and it was suggested that plaintiff should have £1,000 or a position of trust in the company if he obtained the various consents that were wanted. That, however, did not now arise. Plaintiff was asked if he could introduce capital, and Robertson agreed to give him 10 per cent. commission on his introductions. None were effected. Plaintiff was paid £5 per week for four weeks, and he called on various local councils; but defendants did not go on with the scheme, and plaintiff now claimed to be paid for several weeks' work done for defendants.

Mr. Robertson, defendants' managing director, gave evidence that plaintiff promised to introduce capital, and to get consents from local boards to the running of omnibuses in various parts of Lancashire, but he had done nothing but "bluff."

Judge Lumley Smith, K.C., thought that the plaintiff had been paid enough. It was a voluntary payment. He gave judgment for defendants on the claim and counter-claim, with costs.

OLYMPIA MOTOR CAR EXHIBITION.—The annual show of private motor cars was opened at Olympia on November 7, and it will remain open until the 15th inst.

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# MOTOR TRAFFIC.

## DAIMLER ALLIANCE WITH THE L.G.O. WORKS.

Sir Hallewell Rogers, in moving the adoption of the report presented to the Birmingham Small Arms Company at the annual meeting held on October 8, mentioned that the Daimler Company during the past year made a net profit, amounting in round figures to £128,000, on an investment which stood in the balance sheet at only £351,000. This might be regarded as very satisfactory, and he might state that the aggregate profits of the Daimler Company for the four years during which they had owned that company had been upwards of £430,000. The extensions of the works which were now needed were the result of the adoption of a very progressive programme in the development of commercial vehicles and chassis for omnibuses. They had concluded an arrangement which, while enabling this part of the business still to progress, was not likely to make for some years to come any further demands upon the capital resources of the company. The arrangement in question was a working alliance between the Daimler Campany and the manufacturing undertaking connected with the London General Omnibus Company, known as the Associated Equipment Company, whereby omnibuses and certain sizes of commercial vehicles, for which there was a large demand, would be made at the factory of that company. The factory was, perhaps, the most modern one which had been constructed, enabling any possible demands for that particular vehicle which they could foresee to be adequately and quickly met by that company for them. Incidently another advantage accrued to the company from this alliance in removing from the field of competition an undertaking which would otherwise undoubtedly secure a large proportion of the orders going, having regard to its great and unique experience in the manufacture and operation of this class of vehicle. The London General Omnibus Company were operating a large number of omnibuses manufactured by the Daimler Company, and as a result of their experience with these vehicles had placed an order for a considerable number of Daimler sleeve valve engines for use with the General Omnibus Company's fleet. A satisfactory feature of this arrangement was that it enabled the Daimler Company to devote the resources of the existing works to the manufacture of types of commercial vehicles other than those to be made at the Associated Equipment Company's works, and at the same time enabling them to share in the profits.

Mr. E. Manville, in seconding the motion, emphasised the advantage of the arrangement which had been come to with regard to the acquisition of the output of another large factory, saving them, as he hoped, further expenditure on the Daimler side for many years.

The following dividends were agreed to: On the preference shares at the rate of 2½ per cent., less income tax, amounting to £4,782 9s. 9d.; on the ordinary shares at the rate of 5 per cent., together with a bonus of 1s. per share, free of income tax, amounting to £76,698 4s. The sum of £10,000 is carried to the general reserve fund and £50,000 to machinery reserve fund.

## INSTITUTION OF AUTOMOBILE ENGINEERS.

The second meeting of the session of the Institution of Automobile Engineers was held on Wednesday, November 12, in the Hall of the Institution of Mechanical Engineers, Storey's Gate, St. James Park, S.W., when Dr. W. R. Ormandy read a paper entitled "Some Experiments with Mixed Fuels with Special Reference to Alcohol Mixtures."

The Institution has published the presidental address given by Mr. J. S. Critchley on October 8, in which the fuel question is dealt with. The secretary has also issued the paper on "Elements of High-Speed Automobile Engine Design," read by Mr. L. H. Pomeroy at a meeting of the North of England branch.

### Training of the Automobile Engineer.

Mr. J. S. Critchley in the course of his presidential address to the Institution of Automobile Engineers in London, said: The subject of the training of the automobile engineer came up for discussion last session. He proposed to devote himself heartily during his year of office to the desirable object of putting the suggestions then advanced into some more definite form, so that the Institution might be in a position to help those who were desirous of having their sons educated in such a way that they might eventually be fitted to occupy seats on the Council of the Institution.

Walsall.—It is proposed by the General Purposes Committee that steps be taken to promote a bill both for extending the tramways by means of trolley vehicles and also motor omnibuses.

## ABSORPTION OF NEW CENTRAL OMNIBUS.

Mr. John O'Connor, M.P., presided at a meeting of the shareholders of the New Central Omnibus Company, held on October 22, when a resolution was unanimously passed approving of an agreement by which the Underground Electric Railways Company of London, Limited, will acquire outright the New Central Omnibus business, instead of continuing the present working arrangement. The agreement provides that the New Central Company will receive £194,000 of 6 per cent. income bonds of 1933 and 48,500 A ordinary shares of 1s. each of the Underground Company, and a sum in cash which will enable the New Central Company, after providing for all prior charges, to pay a dividend at the rate of 8 per cent. per annum for the nine months ended June 30, 1913, from which date the interest and dividends on the new Underground bonds and shares will accrue. As the issued capital of the New Central Company is £96,689 in £1 shares, the purchase consideration provides a little more than £2 of Underground bonds and half a one-shilling A share for each New Central share. At the present prices of the Underground securities this is equivalent to a cash value of about £2 os. 6d. for each New Central share.

In moving the resolution, the chairman said the company were restricted to the running of 100 vehicles under the existing agreement, and the policy of the London General Omnibus Company of pursuing a course which would serve the public to the best advantage by increasing the number of omnibuses must inevitably reduce the unit-earning capacity of each 'bus run. This being so, the New Central Company could not hope in the future to receive the net profits on the same basis as earned in previous years. As the result of interviews extending over some months the new agreement had been evolved, and this would overcome the difficulty, and secure for the shareholders an immediate income upon a newer and broader basis. The scheme also provided for a payment for three years of the directors' present salary, and in return they consented to be bound down from directly or indirectly carrying on or being interested in the business of proprietors or manufacturers of motor omnibuses within a radius of 30 miles of Charing Cross or 10 miles from the town of Bedford. He thought the shareholders, instead of receiving the former minimum dividend of 8 per cent., could look forward to at least 12 per cent. per annum, and they would still have an interest in the prosperity of the London General and Underground group of railways in the possession of 48,500 A shares.

## PETROL-ELECTRIC FIRE APPLIANCES.

At a meeting of London County Council, on October 21, the Fire Brigade Committee presented a report recommending new arrangements for obtaining certain petrol-electric appliances. The proposals were that expenditure on capital account up to £3,265 for the purchase of two petrol-electric turntable ladders be sanctioned; that acceptance of an offer by Magirus, Ewald, and Lieb, of Ulm, to supply two Magirus ladders for £1,200 be approved; and that acceptance of an offer amounting to £2,200 of Cedes Electric Traction, Limited, for the supply of two petrol electric chassis for fitting to Magirus ladders and the fitting thereof be approved. It was also recommended that expenditure on capital account of £975 for obtaining a petrol-electric escape van be sanctioned; that the acceptance of an offer amounting to £890 of Cedes Electric Traction, Limited, for the supply of a petrol-electric chassis for an escape van be approved; and that the work of completing the escape van be carried out at a cost not exceeding £150 by direct employment of labour under the direction of the Fire Brigade Committee. The committee further proposed that motor cars should be obtained for the use of the two divisional officers of the Fire Brigade. Under existing arrangements these officers were provided with horse-drawn carriages. Motor cars had already been provided for the assistant divisional officers and for the superintendents. An offer to supply at £250 each the chassis (without tyres) for the two cars required had been received from the Wolseley Tool and Motor Car Company, which supplied the chassis for the superintendents' cars. The estimated cost of each car was £450, and it was proposed to arrange for the supply of the bodies and the purchase of the tyres and accessories separately. The proposals were adopted

Edison Accumulators, Limited.—The board of this company now comprises Lord Montagu, Colonel H. C. L. Holden, Messrs. B. M. Drake, A. L. Pearce, and J. F. Monnot (managing director). The company has taken new offices in Duke Street, W.



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# MOTOR TRAFFIC.

## MOTOR TRAFFIC NOTES.

MOTOR VEHICLES REQUIRED IN ASSAM.—The tea and rice planters of Assam are showing great interest in the improvement of communication. A great impetus has lately been given to trade.

ELECTRIC OMNIBUSES FOR BERLIN.—It is announced that two lines of electric omnibuses are about to be established in Berlin. The vehicles will, like the electric cabs, carry their power in accumulators.

NEEDS OF WEST BROMWICH.—The Highways Committee of the Corporation are considering a report from the borough surveyor on the question of the railless trolley car and the motor omnibus.

MUD-GUARDS FOR OMNIBUSES.—Messrs. Tilling, Limited, have adopted for their motor omnibuses running in the metropolitan area a mud-guard reported to be arranged in such a way that it is not damaged when it collides with the kerb or other obstacles.

AVON MOTOR TYRES.—The Avon India Rubber Company, Limited, Melksham, Wiltshire, have issued well-printed brochures giving the prices of the wide range of commodities manufactured at their works, and describing the manner in which Avon motor tyres are made. The solid tyre department includes the band and clinched-on types.

A LEEDS SUBURBAN SERVICE.—On October 30 the Leeds tramways department started a motor omnibus service between Moortown and Shadwell, in compliance with the promise made by the Corporation to the new ward before it came within the city boundary. The petrol-electric omnibus was supplied by W. A. Stevens, Limited, of London.

CARRIERS ACQUIRING RAILWAY TRAFFIC.—A deputation of the Newcastle and Gateshead Chamber of Commerce on October 13 informed the manager of the North Eastern Railway that owing to railway delays traders were being compelled to send a large amount of outward traffic by carriers, and that goods were being brought from London by steamer as far as possible.

"SOUTHERN" MOTOR OMNIBUSES.—Since the amalgamation of the South Metropolitan Tramways Company with the London Traffic Combine the company, whose tramways serve the district between Croydon, Crystal Palace, Sutton, and Tooting, have placed a number of motor omnibuses in service between the Crystal Palace and the Albany Street Barracks in north-west London, and on other routes.

HEAVY MOTOR CARS AND TRAILERS.—The Commercial Motor Users' Association have agreed to oppose the application which the London County Council have decided to make to the Local Government Board to issue regulations under the Motor Car Acts, 1896 and 1903, to require that every "heavy motor car" with a trailer shall have a guard at the rear of the trailer who shall warn the driver by means of a communication cord, or otherwise, of the approach of overtaking traffic.

NEED FOR PUBLIC SERVICE VEHICLES AT FOLKESTONE.—Remark was made at the October meeting of Folkestone Chamber of Commerce by the chairman, that that body would have to take in hand the question of a 'bus service. Folkestone had not a service, but Hythe and Cheriton had. A town of 35,000 inhabitants ought to have a thoroughly good tramway or motor 'bus service. The tramway scheme had been blocked and stopped. What were they going to give the town in place of it? Everything suffered in the town through lack of transit.

ROAD MOTORS FOR THE OPENING UP OF CHINA.—In lecturing at York on "Railway Development in China," Mr. P. Burtt, passenger manager of the North Eastern Railway, who four years ago made a tour in that country, stated that when the present troubles settle down the demand for foreign goods would begin. As an instance, the Governor of Szechuen had recently sent to London to ascertain the cost of road motors. His idea was that if he built and levelled roadways now he could soon turn them into railways when he obtained the money with which to finance railways.

LECTURES TO MOTOR DRIVERS.—The first of the series of "steam" lectures to drivers in the employ of members of the Commercial Motor Users' Association was delivered on October 22, to over 100 drivers, at the Royal Automobile Club, by Mr. G. W. Watson, inspecting engineer of the Association. The lecturer dealt in simple language with the construction of boilers, and the need for various fittings, the cause of scaling, pitting, and priming, and how to avoid same, and illustrated his remarks by experiments and diagrams. The second "petrol" lecture was given on November 5.

LONDON POLICE AND THE STOPPING PLACES OF OMNIBUSES.—In reply to representations made by Ilford Tramways Committee, the Commissioner of Police has informed them that the police had instructions to prevent, as far as possible, motor 'buses and tramcars from stopping level with each other, and also to see that the slow-going traffic was kept as much as practicable to the near side of the road. Renewed attention had, however, been called to the matter, and the police would continue to do all in their power to obviate danger to pedestrians and obstruction to traffic.

MOTORISTS AND THE REPORT ON LONDON TRAFFIC.—The Hon. A. Stanley, M.P., chairman of the Royal Automobile Club, at the October meeting of the club committee, pointed out the vital importance to all users of the road of seizing the opportunity afforded by the report of the Select Committee on London Motor Traffic, to make a well-considered effort to obtain by legislation proper regulations for motor traffic under a proper authority. He proposed to apply for a meeting of the National Automobile Council at a later date to consider the proposals which would be put forward by the club.

OMNIBUS COMPANY'S REQUEST TO EAST HAM TRAMWAYS.—In reporting to East Ham Council on a request received from the London General Omnibus Company for the Council to remove their standards in a portion of Forest Drive, in view of the possible danger to passengers on the 'buses, Mr. C. Ullman, the tramways manager and engineer, pointed out that considerable expense would have to be incurred in the near future in the Manor Way, where subsidences in the track and roadway have occurred since the inauguration of the service of omnibuses. The annual report shows a deficiency of £1,217 on the undertaking during the year ended March 31 last, being an increase of £729. The income was £57,969, and the working expenses £45,808.

PROFIT FROM TODMORDEN MOTOR OMNIBUSES.—The persistence of the Town Council in adhering to petrol omnibus traction, despite losses caused by the heavy cost of working machines ordered some years ago, is bringing a reward. The Mayor announced at the last meeting of the Corporation that the Motor Omnibus Committee had had a difficult task in the past years, and it was pleasant to read in the minutes that during the past month the 'buses had carried over 87,000 passengers. After the payment of all charges they had made a profit of nearly £150. On October 30 the Motor Omnibus Committee reported that in comparison with the heavy losses in the early stages of the undertaking, there had been a profit on the past half-year of £485. The successful inauguration of workmen's 'buses was mentioned, and the committee hope to make further developments in that direction.

CONTINENTAL TYRES FOR RAILLESS CARS.—The municipal authorities of South Africa are showing an emphatic and growing appreciation of motor vehicles for their work. Having regard to the heavy nature of this work and the trying conditions of the South African roads, solid rubber tyres have obviously been the principal factor in this evolution of heavy commercial vehicles. In this development the Continental "T" pattern solid tyre has played a conspicuous part. These tyres have been selected for the six vehicles which the Railless Electric Traction Company have on order for Boksburg, the ten "Cedes" cars for Germiston, and the ten "R.E.T." cars for Bloemfontein. The qualities which make for efficiency in solid tyres are durability and resiliency, and these are required in a marked degree for South African work. From the fact that the municipal authorities have exhibited a preference for Continental tyres, it must be evident that they have satisfied themselves of the special fitness of this make for the severe work and rough roads of the country.

BRADFORD TRAMWAYS MANAGER AND THE PETROL OMNIBUS.—In his annual report on the Bradford Corporation Tramways, the general manager (Mr. C. J. Spencer) says: "It is held by some, who are qualified to speak, that the day is not far distant when the tramcar will be superseded by some better vehicle. In what way I am not quite able to appreciate. The petrol-propelled vehicle (motor 'bus) has undoubtedly made great strides, but unless it develops a great deal further than what seems possible at the present time I do not think that it is likely to supersede tramways in Bradford. Prophecies of any sort are, however, dangerous and uncertain, but I think it may be assumed that the Bradford Corporation will, in the future, as in the past, keep well in touch with the development of newer systems of transit, and if it can be demonstrated at any time, after taking everything into consideration, that a better system is available for public use, they will not be slow to take advantage of it. Steady repayment of the debt on the tramways makes it possible for the Corporation to consider such a change without consternation, though I do not think, so far as I can see at present, that there is any need to anticipate any radical change in its transit methods for some years to come. On the other hand it will, I believe, pay the Corporation to keep well in front of tramway development by spending generously in new rolling stock, permanent way, etc,"

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THE

# Tramway & Railway World

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### THE SOUTH INDIAN RAILWAY COMPANY, LTD.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of :—

Tie Bars, Gibs and Cotters for 80lb. and 50lb. Rails, about 118 tons.

Specifications and forms of tender may be obtained at the Company's Offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Tie Bars, Gibs, and Cotters," must be left with the undersigned not later than 1 o'clock, on Wednesday, November 26, 1913.

The Company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of the specification.

Copies of the drawings may be obtained on payment at the Offices of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.

By order, V. E. DE BROE, M.Inst.C.E.,
for Managing Director.

Company's Offices,
91, York Street, Westminster, S.W.,
November 11, 1913.

### METROPOLITAN BOROUGH OF FULHAM.

TURBO-ALTERNATOR AND CONDENSER.

The Council is prepared to receive tenders for the supply, delivery, and erection of a 2,500 Kilowatt Turbo-Alternator with Condensing Plant.

Specification, plan of available space, form of tender, etc., can be obtained from Mr. A. J. Fuller, Borough Electrical Engineer, Townmead Road, Fulham, S.W.

Sealed tenders are to be sent in by 12 noon, on Wednesday, the 26th day of November, 1913, to the undersigned, endorsed "Tender for Turbo-Alternator."

The Council does not bind itself to accept the lowest or any tender.

Town Hall, Fulham, S.W. J. P. SHUTER.

### COUNTY COUNCIL OF KING'S COUNTY.

STEAM TRACTOR AND TIPPING WAGGONS WANTED.

The County Council of King's County are prepared to consider tenders for the supply, delivery, and erection complete, at a cost not to exceed £650, of One Compound Steam Tractor, Two 6-Ton End Tipping Waggons, in accordance with the specifications and conditions, which may be obtained upon application.

Tenders, enclosed in a sealed envelope, endorsed "Tender for Steam Tractor and Waggons," and addressed to the Presiding Chairman of the County Council, must be delivered at the Court House, Tullamore, on or before Tuesday, November 25, 1913. The County Council do not bind themselves to accept the lowest or any tender.

By order, CHARLES P. KINGSTON.
Secretary.

Court House, Tullamore.

### BURMA RAILWAYS COMPANY, LTD.

The Board of Directors of the Burma Railways Company, Limited, are prepared to receive tenders for the supply of 204,000 Steel Coachscrews for 60lbs. (B.S.) Flatfooted Rails.

For each specification a fee of 10s. will be charged, which will not be returned. Tenders, enclosed in sealed envelopes addressed to the "Chairman and Directors" and endorsed "Tender for Steel Coachscrews," must be delivered at the Company's office not later than noon on Tuesday, 18th November, 1913.

The Directors do not bind themselves to accept any or the lowest tender, and reserve the right to divide the order. The material is very urgently required in Burma.

By order of the Board,
W. HOME,
Managing Director.

199, Gresham House,
Old Broad Street, London, E.C.
November 12, 1913.

### PLYMOUTH CORPORATION.

The Plymouth Corporation is prepared to receive tenders for the undermentioned works in connection with the Electricity Undertaking of the Borough, viz. :—

Contract No. 31.—Ironclad High-Tension Switch Panels.

Copies of the conditions, specification, and form of tender may be obtained from the undersigned on the deposit of one guinea for each copy, which will be returned after receipt of a *bonâ-fide* tender upon the prescribed form and within the stated time.

Should a tender be withdrawn the amount of the deposit will be forfeited.

Sealed tenders, endorsed "Contract No. 31," must be delivered to the undersigned not later than December 1, 1913.

The Corporation does not bind itself to accept the lowest or any tender.

(Signed) E. G. OKELL,
Borough Electrical Engineer.

November 11, 1913.

### THE ASSAM BENGAL RAILWAY COMPANY, LTD.

The Assam Bengal Railway Company, Limited, is prepared to receive tenders for :—

Wheels and Axles.

Specifications and tender forms may be obtained at the offices of the Company, Bishopsgate House, 80, Bishopsgate, E.C. A fee of £1 1s. is charged for each specification, which cannot under any circumstances be returned. Drawings may be had at the cost of the tenderer by application to Messrs. Hodges, Bennett and Co., 113, Cheapside, E.C.

Tenders must be delivered at the Company's offices not later than noon on Monday, December 1, 1913. The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,
OSWALD J. MILNE,
Secretary.

### COUNTY BOROUGH OF SOUTHAMPTON.

STEAM TURBO-ALTERNATOR.

The Corporation invite tenders for the supply, delivery, and erection of a Steam Turbo-Alternator at the Electricity Supply Station, Western Esplanade.

A specification and form of tender may be obtained upon application to the Borough Electrical Engineer.

Sealed tenders, endorsed "Tender for Alternator," must be delivered at the Town Clerk's Office.

No pledge is given to accept the lowest or any tender

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
November 11, 1913.

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### THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely :—

Turpentine.
Fencing Wire Strand.
Bellows.
Disinfecting Powder, etc.
Steelwork for Bridges.
Spare Parts for Carriages and Wagons.
Helical and Volute Springs.

Specifications and forms of tender may be obtained at this Office, on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in sealed envelopes, addressed to the undersigned, marked "Tender for Turpentine," or as the case may be, not later than 11 o'clock a.m., on Thursday, November 20, 1913.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company Offices,
48, Copthall Avenue, London, E.C.,
November 12, 1913.

### LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply—

Steel Sleepers.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 o'clock p.m. on Tuesday, November 25, 1913, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
November 12, 1913.

### EGYPTIAN WAR DEPARTMENT.

Tenders are asked for the supply of

Mild Steel Tees.
,, ,, Angles.
,, ,, Bars and Sheets.

All particulars obtainable from Sir A. L. Webb, K.C.M.G., Queen Anne's Chambers, Westminster, S.W.

Tenders returnable December 17, and to remain open seven days.

*(Continued on page 457.)*


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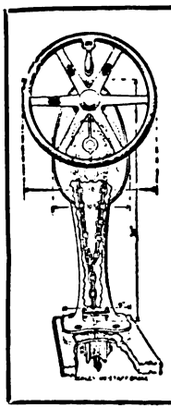

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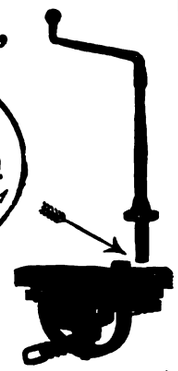


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THE
# Tramway and Railway World

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## MERIT AND DEMERIT MARKS.

Too little importance appears to be attached nowadays to the bestowal of merit marks on car employees. Probably the reason is to be found in a desire to lessen the amount of clerical work that such a scheme would involve on undertakings whose growth has brought about a large increase in the number of hands. It is possible, however, to adopt a simple system entailing little or no labour. We refer to the old method of awarding merit badges, which now seems to have almost disappeared. These badges were awarded for neat appearance, attention to passengers, and general good conduct, and their possession meant an additional shilling per week to a man's pay. A reward of this kind would appear to be especially useful on undertakings where demerit marks are recorded. The latter system in itself is a more humane way of dealing with men than by the infliction of punishments that entail suffering on the part of a man's dependents. It was this aspect that led to the adoption of the demerit mark system some time since by the management of the London United Tramways, but it has now had to undergo some modification. The recent concessions made to the London General Omnibus section of the allied companies' men led to the London United Tramways' employees forwarding a request for a revision of the demerit mark regulations. Among the offences for which these marks are given are the missing of fares and excess fares, reading newspapers while on duty, failing to stop at a compulsory stopping place and also at church stopping places during hours of divine service. Hitherto a first offence entailed a warning by letter, a second one resulted in ten marks being put against the offender, with five marks in the event of neglect to collect an excess fare. When the total number of marks recorded reached sixty a man has been discharged. Three of the depôts desired the abolition of the system, and one depôt asked that it should be revised. The management invited delegates, consisting of a driver and conductor from each depôt, to attend a conference, with the result that the rules now provide that each offence involving five demerit marks or less will, on a first occasion, be dealt with by a caution. All new men will receive merit and demerit marks on the same footing as men of longer service, but at the end of six months half of the total demerit marks received by them will be taken from their records. In place of the present maximum of demerit marks warranting dismissal, a man will be allowed sixty marks for the first two years' service; between two and four years, seventy-five marks; between four and six years, ninety; between six and eight years, 105; between eight and ten years, 120. The length of service dates from July, 1910. When demerit marks are entered against any man he has the right of appealing within seven days, and such appeal will be dealt with by a committee comprising the traffic superintendent and other officials. It will be interesting to learn in what manner the management of the Nottingham tramways propose to overcome the unreasonable objections of their employees to the bonus system which was inaugurated last Christmas in connection with the adoption of car meters, in consequence of the continuous increase in the amount of power used by the cars. The bonus scheme allowed for the division of the sum of £150 per annum in amounts ranging from 20s. to 5s. each to the 66 drivers who showed the best results, with half these amounts to the conductors working with the drivers. The result has been that during the nine months ended September 30 the cost of power was reduced by no less than £2,900. During the same period 1,000,738 more passengers were carried, and the number of accidents was considerably less, whilst the amount paid in compensation was reduced by nearly 50 per cent. The system remains in force pending the completion of an amended arrangement to take its place. In reporting this decision to the men their deputation stated that they understood the new method would be based on merit, but if that meant the fixing of a standard of current consumption it would probably be regarded as unsatisfactory. They also claim that a uniform standard of current allowance should be accompanied by a uniform regulation as to the number of standing passengers allowed in the car.

## TRAMWAY CHAIRMEN FOR 1913-14.

The reorganisation of the Town Councils after the annual November elections is now being completed. In the great majority of cases the chairmen and vice-chairmen of the various Tramway Committees have been re-appointed for the ensuing year, as will be seen from our subjoined list. The list will be continued in our next issue.

| TOWN. | CHAIRMAN. | VICE-CHAIRMAN. |
|---|---|---|
| Accrington .. | Alderman Higham .. .. | *Councillor Morley. |
| Ayr .. .. | Police-Judge Ferguson .. | *Bailie Gould. |
| Bacup .. .. | Alderman J. H. Maden .. | Alderman J. Craven-Hoyle. |
| Belfast .. .. | Alderman Sir R. Anderson .. | Alderman J. S. Finnigan |
| Birkenhead .. | Councillor H. Halsall .. .. | ——— |
| Birmingham .. | Councillor H. Barrow .. .. | ——— |
| Brighton .. .. | Alderman F. T. Wilson .. | ——— |
| Burton-on-Trent .. | Alderman J. S. Rowland .. | Alderman T. E. Lowe. |
| Chester .. .. | Alderman J. Jones .. .. | Councillor J. Dodd. |
| Chesterfield .. | Alderman Shentall .. .. | ——— |
| Derby .. .. | Alderman R. W. Spriggs .. | Councillor Dean. |
| Doncaster .. | Councillor Stirling (Mayor) .. | Councillor Balmforth. |
| Dundee .. .. | Councillor G. A. Johnston .. | ——— |
| Leeds .. .. | *Alderman R. A. Smithson .. | |

* Denotes a change in the chairmanship or vice-chairmanship.

**Omnibuses for Montreal.**—A first batch of 150 motor omnibuses have been built by the Associated Equipments, Limited, and Daimler Company to the order of the Canadian Auto-Bus Company of Montreal. The vehicles are heated electrically and lighted.

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# CONVEYANCE OF GOODS ON LIVERPOOL TRAMWAYS.

A Report by the General Manager.

Mr. C. W. Mallins, the general manager of the Liverpool Corporation tramways, in a report to the Tramways and Electric Power and Lighting Committee deals exhaustively with the proposal to utilise the tramways for the conveyance of goods to neighbouring towns. He remarks as a preliminary caution that none of the British Tramway Authorities have attempted to utilise their systems to any great extent for the conveyance of goods, and there is consequently no precedent as a guide. The question, however, appears to be of such vital importance to the trade of the Port and the City of Liverpool that he considers that every effort possible should be made to increase the transport facilities, particularly bearing in mind the difficulties which the mercantile community are at present experiencing in connection with the transport of merchandise. In the year 1882 the tonnage entering and leaving the Port of Liverpool amounted to 16,208,272 tons, whilst in 1912 it had risen to 34,654,830, or an increase of 113 per cent. in 30 years.

Mr. Mallins then proceeds in part as follows :—

The traffic congestion problem as it stands at present may be divided under two heads :—

(1) Local Traffic between Docks and Railway Stations and Warehouses.—A great portion of this is dealt with by horse traction entailing the use of a very large number of vehicles, necessarily of small carrying capacity, which can only move at a slow rate; they consequently increase the congestion on the limited quay space and on roads adjacent to the docks and stations.

The general manager is of opinion that, if a thoroughly well organised system equipped with the most modern type of mechanically-propelled vehicles—possibly of the electric storage battery type, with a cheap power supply—were provided to deal with the work now carried out by the horse vehicles, the work could be performed by 50 per cent. fewer vehicles, which would materially lessen the congestion, and it is reasonable to assume that the work would be carried out at a much lower cost, thus solving the local portion of the problem. The general manager does not enter into the details of a scheme on these lines, but leaves the suggestion to the consideration of those responsible in the matter.

(2) The Transport of Merchandise between the Docks and the Manufacturing Centres.—The facilities offered by the railway companies do not appear to be adequate, as it is alleged that delays frequently occur in transit, causing serious inconvenience and loss, while in addition the rates charged are considered excessive; the greatest difficulty, however, appears to arise from the slow delivery of the goods.

Through the courtesy of an old and highly esteemed firm of cotton merchants, the general manager has ascertained that the rate charged for the conveyance of both American and Egyptian cotton between the Liverpool Docks and Bolton, Lancashire, a distance of 32 miles, is 8s. 4d. per ton, exclusive of all terminal charges. This works out at $3\frac{1}{8}$d. per ton mile. The charges for the transport of other merchandise vary according to the class of goods. It is not surprising therefore that the merchants and traders are anxious to discover a cheaper and more expeditious system of transport, and they naturally look to the tramways to utilise their system for the purpose, if possible.

The great advantage of a cheap and expeditious system of transport for goods is evident, as are the difficulties to be surmounted before such a system could be brought into operation. The first consideration must necessarily be as to what facilities the Mersey Docks and Harbour Board are prepared to grant to enable any new system of transport to enter the Dock Estate; this is undoubtedly the key of the position so far as the solution of the Docks traffic problem is concerned.

The general manager is of opinion that it is quite impracticable to operate a goods service of any magnitude over the existing lines. The Knotty Ash and Pier Head route is the only one which has a connection with tramways outside the Liverpool system, but the passenger traffic on this route is very heavy, necessitating a very frequent service of cars between the hours of 4.30 a.m. and 12.30 midnight. At the maximum time of traffic, cars run at intervals of every $1\frac{1}{2}$ minutes and, at the minimum, every 4 minutes. It will, therefore, be seen that it would be quite impossible to operate a goods service over this route in addition to the passenger service before mentioned, except for a limited number of hours in the early morning, and the fact must not be overlooked that repairs have to be carried out, both to the track and overhead equipment, during these hours. The general manager considers it would be quite impracticable to attempt to utilise any of the existing lines in the central area of the city for the transport of merchandise on any considerable scale, as they are at present taxed to their utmost capacity in dealing with the passenger traffic, which is every day becoming a more pressing problem, and one which it will be necessary for the committee to seriously consider in the not distant future. The most that could therefore be done with the existing lines would be to try a system of goods transport tentatively on a very limited scale, say, three or four trains per day, entailing a comparatively small capital expenditure, and, if found successful, a more elaborate system could be established on the following lines, provided that the Mersey Docks and Harbour Board, and the Bootle Corporation, were prepared to grant the necessary facilities, and further, that the merchants and shippers gave their full support to the scheme, by guaranteeing a traffic of at least 1,314,000 tons of merchandise per annum from and to the Docks, at, say, $2\frac{3}{4}$d. per ton mile by the new system, exclusive of terminal charges. This would provide a revenue amounting to £105,394 per annum, which would cover the operating expenses and standing charges, and also reserve, renewal and depreciation, and allow a reasonable margin for other contingencies. It is quite probable that a considerable volume of mineral traffic and farm produce would be transported by the new system, which would materially help in securing the necessary guarantee to cover the charges before referred to.

The permission of the Mersey Docks and Harbour Board to electrify the Dock Railway, with the necessary connections, would have to be obtained, the total length of which is 22 miles single line, and the approximate cost £154,000. In this connection it might be considered desirable to lower the level of the portions of the railway, abutting on the approaches to the landing stage, from the street level to a shallow tube, and by that means obviate a great deal of the obstruction that now takes place in connection with the operation of the railway, the cost of which is *not* included in these estimates.

In the alternative, if it were considered impracticable to electrify the Dock Railway, the construction of a line of tramways parallel with the railway, outside of the Dock Estate, in the public streets, with the necessary connections to the Estate, might be undertaken. The total length would be about $22\frac{1}{2}$ miles single line, and the approximate cost £157,500.

The construction of a tramway to deal with the North Docks traffic, between Alexandra Dock and Knotty Ash terminus, would also be necessary, the length of which is about $7\frac{3}{4}$ miles single line, including passing places; the cost would approximately be £54,250. The consent of the Bootle Corporation would, of course, be necessary before this line could be laid down.

The construction of a tramway for the purpose of dealing with the South Docks traffic, between Brunswick Dock and Knotty Ash terminus, would also be necessary, the length of which is about five miles single line, including passing places, and would cost approximately £35,000.

With these connections it would be possible to operate a service of trains, consisting of one motor and two trailer wagons, for which the Board of Trade would be prepared to grant provisional authority. These trains would have a total carrying capacity of 25 tons each, and would run at intervals of every 10 minutes on each of the branch lines, making a total of 288 trains per day, capable of conveying 7,200 tons of goods, or a total of 2,628,000 tons per annum to the city boundary. In order to equip these lines to their full capacity the following would be the approximate rolling-stock necessary :—30 motor vehicles and 72 trailer wagons; but, as the South Lancashire Tramways Company's system is only capable of dealing with about 144 trains per day, it would not be necessary to purchase the whole of the rolling stock until the company increased the capacity of their system, which it is understood they are prepared to do if the result of an experiment warranted the expenditure. Fourteen motor vehicles and 28 trailer wagons would be capable of conveying 3,600 tons per day, or 1,314,000 tons per annum, and, with spares, would cost approximately £22,000. This instalment of rolling stock would be sufficient to establish the system and could be increased as traffic developed. In order to provide the necessary shed accommodation, another £5,000 must be added. The South Lancashire Tramways Company and other undertakings would, of course, provide their own portion of the rolling stock. Adding these latter sums for rolling stock and shed accommodation to the sums already mentioned for the construction of lines, the total capital expenditure would amount to £273,750, and an annual sum of £90,655 would be required for operating costs and standing charges, and reasonable allowance for renewal and depreciation, viz. :—

ESTIMATES OF ANNUAL EXPENDITURE AND INCOME.

| | |
|---|---|
| *Traffic.* | |
| Superintendence | £600 |
| Wages of motormen, conductors, and other employees | 9,000 |
| Cleaning and oiling vehicles | 1,424 |
| Cleaning and sanding track | 250 |
| Fuel, lighting, and water for depôts | 200 |
| Uniform of employees | 500 |
| Miscellaneous charges | 1,000 |
| | £12,974 |
| *General Charges.* | |
| Permanent way | 9,000 |
| Electrical equipment | 1,500 |
| Buildings and fixtures | 120 |
| Workshop and tools | 50 |
| Motor and trailer wagons | 2,280 |
| Power expenses | 20,000 |
| General and management expenses (including rates & taxes) | 5,000 |
| Interest and sinking fund | 17,800 |
| Renewal and depreciation | 13,690 |
| | £82,414 |
| Add 10 per cent. for contingencies | 8,241 |
| Total estimated expenditure | £90,655 |
| Total estimated revenue | £105,394 |
| Balance | £14,739 |

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The sum mentioned for capital expenditure is exclusive of the cost of counting-house facilities, and the provision of a gridiron at the City Boundary, Knotty Ash, where the goods trains would be taken over by the South Lancashire Tramways Company.

The South Lancashire tramways are connected with several Lancashire towns and, by building a certain length of tramways, a junction could be established with several Yorkshire towns, which are connected by various tramway systems. Unfortunately in some of the systems the track is not of the standard gauge, but this difficulty could be surmounted by certain mechanical arrangements. If the trackless system were adopted, however, this difficulty would not exist. The chairman of the South Lancashire Tramways and of the Prescot Light Railway (the Hon. Arthur Stanley, M.P.) at a recent interview with the chairman, deputy-chairman, and general manager, stated that he would be prepared to co-operate with the committee in any scheme they might bring forward for the transport of merchandise over his system.

From the foregoing figures it is quite obvious that to introduce a system of any magnitude for the transport of merchandise by ordinary tramways would involve a large capital expenditure, and, having regard to this fact, it is desirable to consider the practicability of the trackless trolley system as an alternative, although, like the ordinary tramways, this system has not been adopted to any extent in this country for the conveyance of goods. The promoters of the trackless trolley system state that it is quite practicable for the transport of goods, and that it could be established at a cost of £1,700 per route mile, including all charges other than rolling stock, as compared with £7,000 per mile of single track for ordinary tramways, or a total sum of £40,800 for the construction of the 24 route miles required, as compared with £246,750 for the same length of ordinary tramways. Before the system could be established, however, it would be necessary to obtain Parliamentary powers, which would involve certain further expenditure. This, together with other charges, would amount to, say, another £4,000, or a total of £44,800, and in order to equip the routes with the necessary rolling-stock to convey the quantity of merchandise required to cover the operating costs and standing charges for the first instalment, 24 trains would be required, costing £1,900 each, or a total of £45,600, with an additional sum of £10,000 for spare trucks and shed accommodation. Adding this sum to the amount already mentioned for the erection of overhead lines and other equipment would make a total of £100,400, with an annual sum of £78,136 for operating costs and standing charges, renewal, and depreciation; in order to provide this sum it would be necessary to have a guarantee from the merchants and shippers that they would be prepared to transport 1,314,030 tons from and to the Docks at, say, 2½d. per ton mile, exclusive of terminal charges, amounting to £65,812. This extremely cheap rate per ton mile is possible owing to the comparatively small capital expenditure necessary to establish the trackless system.

The operating costs and standing charges are estimated as follow:—

TRACKLESS TROLLEY SYSTEM.
ESTIMATES OF ANNUAL EXPENDITURE AND INCOME

*Traffic.*

| | £000 |
|---|---|
| Superintendence | |
| Wages of motormen, conductors, and other employees | 10,850 |
| Cleaning and oiling vehicles | 1,040 |
| Fuel, light, and water for depôts | 200 |
| Uniform of employees | 550 |
| Miscellaneous charges | 1,000 |
| | £14,840 |

*General Charges.*

| | |
|---|---|
| Electrical equipment | 1,500 |
| Buildings and fixtures | 120 |
| Workshop and tools | 50 |
| Maintenance of vehicles (steel tyres) | 11,109 |
| Power expenses | 20,000 |
| General and management expenses (including rates & taxes) | 5,000 |
| Interest and sinking fund | 10,322 |
| Renewal and depreciation | 8,032 |
| | £71,053 |
| Add 10 per cent. for contingencies | 7,105 |
| Total estimated expenditure | £78,136 |
| Total estimated revenue | £95,812 |
| Balance | £17,676 |

The tonnage mentioned above would be required to cover standing charges and operating expenses, but the system would be capable of dealing with 2,628,000 tons per annum, equal at 2½d. per ton mile to £191,625 per annum; this would make it both extremely cheap to the merchants and profitable to the operators.

On making a comparison between the cost of constructing an ordinary tramway, and the trackless trolley system, it becomes quite clear that the latter system is infinitely cheaper to construct, and if the statements made by the promoters are correct, it would be found equally as efficient for the purpose, and would possibly prove more flexible in dealing with the problem before the committee; but before the system could be recommended the promoters would have to demonstrate satisfactorily the practicability of the system in actual working.

The whole of the figures quoted are approximate, but ample provision is made to cover every item of expenses mentioned.

The costs of collecting and distributing depôts have not been included, as they are not considered necessary in connection with the Liverpool portion of the scheme; for this would only deal with the traffic between the docks and the city boundary at Knotty Ash, where, if the scheme developed, a gridiron and sorting depôt would be necessary as referred to above. No doubt collecting and distributing depôts would be necessary for the other tramway undertakings which would deal with the traffic beyond the Liverpool boundary.

## L.C.C. TRAMWAY MATTERS.

STOPPING PLACES FOR CARS AND OMNIBUSES.

The Highways Committee presented a report at last Tuesday's meeting of the London County Council with reference to communications from the Commissioner of Metropolitan Police in regard to suggested tramway car stopping places. With a view to drawing up regulations the Commissioner had proposed a conference with representatives of the Council and the London General Omnibus Company, but the Committee had suggested to the Commissioner that this question should stand over until the Council had an opportunity of considering the important matters raised by the proposals in the report of the Select Committee on Motor Traffic. In the meantime proposals with regard to stopping places of tramcars and motor omnibuses at New Cross Gate and the Marquis of Granby had been submitted by the Commissioner. The proposals consisted in some instances of an arrangement by which the omnibuses would pick up and set down passengers at the natural traffic points, while the tramcars would be required to stop at a little distance from these points. The numbers of tramway passengers at these places were approximately five times as many as the numbers of omnibus passengers. It appeared to the Committee that the Commissioner's proposals would involve considerable inconvenience to the larger portion of the travelling public. Through tramcar services at these points had been in operation for a much longer time than the omnibus services, and in view of the much greater extent to which they were used it did not seem to the Committee desirable to make alterations which would impair their utility. They had suggested to the Commissioner that certain alternative arrangements should be made, and these were now under consideration.

The Committee's action was approved.

PETROL-ELECTRIC CARS.

Reference was made by the Committee to the fact that the Council on July 30 last year sanctioned expenditure of £2,400 for the alteration and equipment of three horse-cars as self-propelled tramcars for the purpose of enabling an examination to be made of the possibilities of this system of traction, which it was proposed to install on the tramways in Burdett Road and Grove Road. A service of petrol-electric cars had since been run experimentally on a route in another part of London (Tooley Street to Greenwich Church) in order that an idea might be gained of the cost of running, etc., of this system. The result of this experiment had convinced the Committee that the Burdett Road and Grove Road route was not suitable for working by means of petrol-electric cars. They were giving consideration as to the best method to be adopted for dealing with tramways on this route.

Consideration of this report was adjourned.

POWER TO WORK TRAMWAYS.

The Council were reminded that their Tramways Act of 1913 was considered by the House of Commons on July 14, when Clause 30, which provided for the Council working certain small lengths of tramways in London which were not covered by the Council's Tramways Act of 1899, and Clause 31, which provided for the London United Tramways having running powers over the lines in London about to be purchased from the company by the Council, were deleted. The Highways Committee now proposed and the Council agreed that authority be sought in the session of Parliament of 1914 to enable the Council to work all tramways which had been purchased since the passing of the Council's Tramways Act of 1896, or which might hereafter be purchased.

GREENWICH POWER STATION PLANT.

In connection with the extension of the plant at Greenwich generating station, the Committee reported that it was necessary that certain minor works should be carried out, and these could not very well be made the subject of contracts. They recommended that the undermentioned works should be carried out at a cost not exceeding £1,000 by direct employment of labour under the Highways Committee:—(1) The supervision of the installation of high-tension switchgear; (2) the power wiring for auxiliary motors; (3) the re-arrangement of the electric lighting of the station; (4) the electric lighting in connection with the laying of condensing water pipes; (5) any other incidental works of a like nature.

The recommendation was adopted.

HIGHWAYS COMMITTEE'S LEGISLATIVE PROPOSALS.

Considerable discussion took place in regard to the four tramway extension schemes, consideration of which had been postponed from last week, and the minority severely criticised next year's programme on the ground of its inadequacy.

Mr. G. H. Hume, the acting chairman of the Highways Committee, defended his policy on the ground that removal of dead-ends and linking up was imperative to ensure success of any larger extension that might be sanctioned should a new traffic authority be created.

Eventually, the Committee's proposals were approved.

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## MISCELLANEOUS NEWS AND NOTES.

**Lifting Jacks for Cars.**—Oldham Tramways Committee have decided to provide the latest lifting appliances for all of the cars, the crews to be instructed in their use.

**Light Railway Rules.**—Revised rules with respect to applications to the Light Railway Commissioners under the Light Railways Acts, 1896 and 1912, have been issued by the Board of Trade.

**Quicker Fare Collection.**—Ayr Tramways Committee have asked the manager to report whether means could be devised for a speedier collection of the fares during the race meetings and other times of heavy traffic.

**Midday Return Tickets.**—Oldham Tramways Committee have asked the manager to report upon the question of issuing penny return fares in order to enable workpeople to go home to their midday meal. Such a service was recently instituted at Darwen.

**Power Plant and Motor Appliances for Bradford.**—On November 13 a Local Government Board inquiry was held at Bradford into the Corporation's application to borrow £91,250 for extensions of plant at Valley Road generating station, and £2,440 for the purchase of two motor turbine pumps and a motor first-aid tender for the Fire Brigade.

**Longer Truck Experiment at Plymouth.**—Alderman Phillips has reported to the Town Council that the experiment of trying a car with a longer truck promised to be successful. There was less power used and less strain on the curves. If it succeeded they might apply to the Board of Trade for permission to use top-covered cars.

**Greenock Municipalisation Scheme Rejected.**—By 12 votes to 8 the Corporation of Greenock on November 11 rejected a motion by Councillor Mitchell to give notice to the Tramway Company that it had been decided to exercise the option to terminate the lease at the first break, on May 15, 1914. By 12 votes to eight the Council renewed the lease to the present company.

**Carriage of Mail Bags by Tramcar.**—Sheffield Tramways Committee have agreed to convey mail bags by tramcar without being accompanied by a post office official at 2d. per bag per journey for bags not exceeding 28 lbs., and 3d. per bag per journey for bags exceeding 28 lbs. but not exceeding 56 lbs., the Corporation not taking or accepting any liability in connection with the work.

**Increases for Newcastle Employees.**—The Tramways Committee have increased the pay of motormen and conductors by 1s. per week at the end of four years' service, making their wages 33s. per week. The wages of body-makers have been fixed at 9d. per hour, and those of carriage painters have been raised from 8¼d. per hour to 8½d. per hour, in each case for a 53-hours' week.

**Newport and Track Maintenance.**—After a somewhat heated discussion, the Corporation, on November 10, agreed to the Works Committee and the Tramways Committee each appointing five members with a view to considering a reasonable solution of the matter of the maintenance of the tramways permanent way. In reply to a question by a Councillor, Mr. A. Nichols Moore, electrical and permanent way engineer, said he was trained as a civil engineer before he became an electrical engineer. For about eighteen months he had supervision of road-making work.

**Metropolitan Association of Electric Tramways Managers.**—At the last monthly meeting of the members held at the Municipal and County Club, Whitehall Court, Whitehall, S.W., the following were present:—Messrs. Ullmann (East Ham), Bruce (L.C.C.), Coveney (Erith), Schofield (Leyton), Harvey (Ilford), Moffett (West Ham), Hammond (Metropolitan Electric), Mason (South Metropolitan), and Goodyer (Croydon), hon. secretary. Messrs. Ullmann and Coveney were re-elected chairman and vice-chairman respectively, and Mr. Goodyer was re-appointed hon. secretary.

**New and Prospective Work.**—A special meeting of York City Council on November 11 decided to make application to the Light Railway Commissioners for powers to extend two of the tramways.—A report has been prepared for Stirling Council by the town clerk, the surveyor, and the electrical engineer, estimating the cost of electrifying the tramways and making extensions of the system at £78,100.—Pontypridd Council have directed the surveyor to prepare plans for a tramway from Machine Bridge to connect with the existing tramway in Cardiff Road, in readiness to advertise the contracts.

**A Further Difficulty at Oxford.**—The City Council have rejected, by 27 votes to 25, the proposal of the Tramways Committee in favour of accepting the National Electric Construction Company's scheme for running petrol-electric tramcars in the chief thoroughfares, and overhead trolley cars and motor omnibuses for other routes. It was decided to inform the company that the Corporation relied on existing rights as defined in several Acts of Parliament affecting the parties. An amendment to instruct the City Solicitor to issue a writ forthwith for the recovery of the liquidated damages was defeated. Several members advocated the use of motor omnibuses, and two Colleges sent letters in support of that idea, but it was stated that this course could not be followed unless the horse tramways were purchased at a cost of £28,000. Alderman Carter mentioned that he had received several offers from omnibus companies to come to the city.

**A London Car Overturned.**—Shortly after 8 a.m. on Thursday a London County Council double-deck car was descending the easy gradient at the bottom of Mitcham Lane, Streatham, on its way to Tooting Broadway, when the driver lost control, and the car ran off the line at the wide curve into the Southcroft Road. After travelling about fifteen yards on the wood paving towards the near side of Mitcham Lane, the car overturned on the falling side of the camber, which is rather pronounced at this spot. In its fall the vehicle knocked down a telephone standard and a large number of wires. The roof of the top deck became detached and considerable damage was done to the body. There were no passengers in the car, but the conductor and motorman sustained slight injuries. It is stated that the car was brought to a standstill at the first compulsory stop half-way down the incline, and that the driver found himself in difficulty with the brake before reaching the second compulsory stop about 120 yards further on and 25 yards from the curve. In order to clear away the wreck, the body was detached from the bogie truck and taken away on a steam tractor.

**Bristol Tramways Purchase Question.**—By the statutory majority the Corporation on November 10 carried a resolution authorising the promotion of a Bill to permit of the purchase of the Bristol Tramways Company's undertaking, and to take a poll of the ratepayers upon the question of the acquisition of the lines under the Tramways Act, 1870. Councillor Witty objected to the matter going forward until the Tramways Committee had published the secret figures and reports in their possession. He criticised the experts who had been consulted by the Council, saying that one was managing director of the Leeds tramways, which had paid large sums towards the relief of the rates, but had starved its repairs and renewals. In reply, Alderman Pearson, chairman of the committee, said Mr. Hamilton was not managing director of the tramways. He was manager, and was no more responsible for the allocation of the tramway accounts than any other official. The Council themselves settled what they would do with the profits, and Mr. Witty would find that Mr. Hamilton was not always in accord with the Council as to what should be done with the profits.

## CONTRACTS AND ORDERS.

**Derby Council** have sanctioned a proposal by the Tramways Committee to place two automatic point controllers at the junction of Douglas Street and Osmaston Road, at a cost of £80.

**Walsall Council** have accepted the tender of the British Westinghouse Company for the supply of a motor and starter, at £27 9s., and of the Callender Cable and Construction Company for laying a length of cable, at £123 17s.

**The Titan Trackwork Company, Limited,** of Rutland Works, Sheffield, have received contracts for points and crossings from the following:—Barnsley and District Tramways Company, Preston, Manchester, and Bootle Corporation Tramways.

**Wigan Council** have accepted contracts for installing a new turbine and accessories at the electricity works. Councillor Bickerstaffe mentioned that the Electricity Committee had obtained the very best articles they could get, and they could not bought cheaper without going to Continental makers.

**Sheffield Council** have placed the following contracts:—Brightside Foundry and Engineering Company, engineering work at Holme Lane car depôt, £11,118; Army and Navy Manufacturing Works, Limited, 1,200-1,300 uniform caps, 2s. 9½d. each, and 1,200-1,300 black waterproof covers, 5½d. each; West End Clothiers Company, Limited, 1,200-1,400 pairs of trousers, 12s. per pair, and 350-400 motormen's melton reefers, 22s. 6d. each; R. S. Whitworth, Limited, 600-700 conductors' serge reefers, 20s. 3d. each; British Electric Transformer Company, two 100 k.v.a. testing transformers, £168; Firth, Blakeley, Sons and Co., supply and erection at Neepsend power house of a wrought-steel shoot, £116.

## PERSONAL.

**Mr. H. Hughes,** having been appointed chief clerk to Ashton-under-Lyne Corporation tramways, has resigned his appointment on Walsall tramway staff.

**Councillor J. H. Rodgers,** chairman of the Tramways Committee, was elected an alderman of the Newcastle City Council on November 10 without opposition.

**Alderman R. A. Smithson** has been appointed chairman of Leeds Tramways and Electricity Committee, thus resuming a position he formerly held for more than ten years.

**Mr. L. B. Hogarth,** borough electrical engineer at Morecambe, has been selected for appointment to a similar position at Whitehaven, at a yearly salary of £250. There were 180 applicants.

**Councillor J. H. Hargreaves** has been elected Mayor of Hull. Owing to indifferent health Alderman Robson resigned the chairmanship of the Tramways Committee, and Councillor Hargreaves, the deputy-chairman, was appointed in his place.

**Mr. J. W. Dugdale,** general manager, Oldham tramways, was unable to attend a meeting of the Tramways Committee on November 6. In a letter he stated that he had been unwell and had been attended by a specialist, and was improving a little.

## FINANCIAL REPORTS AND MEETINGS.

**Provincial Tramways Company.**—The directors recommend a final dividend of 1s. per share on the ordinary £1 shares, making a total of 1s. 8d. per share, or 8 1-3 per cent. per annum for the year to September 30. They have also set aside £12,000 for reserve and depreciation and £2,000 as a reserve for third party insurance or for other purposes. £4,440 is to be carried forward.

**The Half-Year at Bournemouth.**—In his half-yearly report, J. Buifin, general manager of the Corporation tramways, shows that the total receipts for the period ending September 30 were £61,034 and the expenditure £32,689, which is an increase on the gross balance for the six months of £2,489, notwithstanding increases of wages and reduction of hours equal to £1,500 a year,

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and the increased cost of coal and other materials equal to £1,000 per annum. The increased receipts due to Sunday running amounted to £4,214.

**The British Electrical Federation.**—The traffic statement for the week ended November 7, 1913, shows that the receipts from tramways and railways amounted to £39,293, as compared with £36,462 in the corresponding week last year, and from omnibuses £12,193, as compared with £1,262, making a total of £51,486, as compared with £37,724. The tramway and railway route mileage was 428.82, as compared with 428.47. The Federation now have 514 omnibuses, an increase of 422 within the year. Upon such of the services as were working both last year and this year, the receipts show an increase of £2,497 upon the week.

(*Continued from page* 452.)

## URBAN DISTRICT COUNCIL OF TEIGNMOUTH.

Tenders are invited for the supply of a Motor Fire Engine.

Particulars may be obtained on application to the undersigned.

Tenders, to be endorsed "Motor Fire Engine," must be delivered to A. Percival Dell, Esqre., Clerk, Town Hall, Teignmouth, on or before November 29, 1913.

The lowest or any tender not necessarily accepted.

F. W. KNIGHT,
Surveyor and Water Engineer.

Town Hall, Teignmouth,
November 10, 1913.

## NORTH-EASTERN RAILWAY.

The directors are prepared to receive tenders for the supply during the six or twelve months from the 1st January, 1914, of the undermentioned articles: 1. Bar Iron. 2. Iron Plates. 3. Steel Plates. 4. Iron Sheets and Hoop Iron. 5. Steel Sheets. 6. Corrugated Iron Sheets. 7. Steel Angles. 8. Mild Steel Bars. 9. Special Steel Bars. 10. Ironwork for Wagons. 11. Metal Castings for Engines. 12. Metal Castings for Carriages and Wagons. 13. Metal Castings for Docks. 14. Metal Castings for Permanent Way. 15. Steel Castings for Permanent Way. 16. Steel Castings (Locomotive). 17. Malleable Castings (Permanent Way). 18. Malleable Castings (Carriage and Wagon). 19. Steel Fish Plates. 20. Cast-iron Chairs. 21. Cast-Iron Point and Crossing Chairs. 22. Cast-Iron Socket Pipes. 23. Gas and Steam Tubes and Fittings. 24. Rain Water Goods. 25. Spring Steel. 25A. Best Cast Steel and Files. 26. Buffer and Bearing Springs for Wagons. 27. Steel Tubes for Locomotives. 28. Brass and Copper Tubes for Locomotives. 29. Copper Pipes. 30. Copper (Bolt). 31. Arc Lamp Carbons. 32. Electric Lamps. 33. Electric Wires and Cables. 34. Electric Lighting, Sundry Fittings. 35. Lead (Pipe and Sheet). 36. White and Red Lead. 37. Linseed Oils (Boiled and Raw). 38. Oils (Paraffin and for Gasmaking). 39. Glass (Sheet and Plate). 40. Glasses (Various). 41. Glasses for Electric Arc Lamps. 42. Shovels. 43. Ropes and Cordage. 44. Tin Plates. 45. Canvas. 46. Brushes. 47. Painters' Brushes. 48. Iron Washers. 49. Nails. 50. Screws (Brass and Iron). 51. Trimming Pins. 52. Cotter Pins. 53. Hinges (Brass and Iron). 54. Steel and Iron Wire Ropes and Cords. 55. Steel and Iron Signal Wire and Signal Cord. 56. Wrought Iron Spikes. 57. Steel Bolts and Nuts. 58. Bolts, Nuts, and Rivets. 59. Cement (best Portland). 60. Concrete and Artificial Stone Flags. 61. Flags (Stone). 62. Stone. 63. Whinstone. 64. Limestone. 65. Slag. 66. Lime. 67. Sanitary Drain Pipes. 68. Common Drain Pipes. 69. Chimney Pots. 70. Oak Trenails. 71. Oak Keys. 72. Oak Cushions. Forms of tender, specification, and conditions may be obtained on application to Mr. E. H. Clark, Stores Superintendent, Gateshead, and tenders must be sent in to the Secretary, at York, sealed and marked "Tender for Stores," not later than 9 a.m. on Tuesday, 25th November. The Directors do not bind themselves to accept the lowest or any tender.

R. F. DUNNELL,
Secretary.

York, November 6, 1913.

## PATENT TIES AND FASTENINGS.

The Proprietors of British Patent No. 26247, of 1909, for "Improvements in and relating to Railway Rail Ties and Rail Fastenings," desire to grant manufacturing licences, or to make other arrangements on reasonable terms for the purpose of working the invention in this country. For further particulars apply MATHYS AND CO., Chartered Patent Agents, 43, Chancery Lane, London, W.C.

## POSITION VACANT.

### ELECTRIC LIGHTING CANVASSER.

Electric Lighting Canvasser wanted immediately for Scotch undertaking. Must be energetic and have some technical knowledge of the business. Wages 35s. and commission.

Address, with reference, No. 520, Keith and Co., Advertising Agents, Edinburgh.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended November 8 amounted to £226,144, or £14,445 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £79 0s. 3d. per track mile, an increase of £2 17s. 10d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

November 14, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

| | Friday, November 14. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | .. 68 2 6 .. | 69 5 0 .. | 78 7 6 |
| ,, ,, (three months) .. | .. 67 12 6 .. | 68 12 6 .. | 79 0 0 |
| Electrolytic Copper—bars or ingots | .. 72 10 0 .. | 75 0 0 .. | 81 15 0 |
| Aluminium—bars or ingots .. .. | .. 83 0 0 .. | 83 0 0 .. | 83 10 0 |

## COAL MARKET.

November 14, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

| | Friday, November 14. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 3 .. | 25 0 .. | 22 9 .. | 22 0 |
| Best Seconds.. .. .. | 24 6 .. | 24 3 .. | 22 3 .. | 21 3 |
| Ordinary Drys .. .. | 21 9 .. | 21 3 .. | 20 6 .. | 20 3 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 20 3 .. | 19 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 18 9 .. | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 20 9 .. | 20 6 .. | 17 0 .. | 17 0 |
| Best Seconds .. .. | 20 0 .. | 19 9 .. | 16 6 .. | 16 3 |
| Ordinary Drys .. .. | 17 3 .. | 16 9 .. | 14 9 .. | 15 3 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 14 6 .. | 14 6 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 13 0 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 .. | 15 0 .. | 14 0 .. | 11 9 |
| Best Seconds .. .. | 13 0 .. | 13 0 .. | 13 6 .. | 11 6 |
| Smalls .. .. .. | 7 3 .. | 7 6 .. | 10 6 .. | 5 9 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Nov. 11 | £57,910 | £59,095 | 45 | £2,495,293 | +£191,402 |
| Auckland .... (28 days) | Oct. 24 | 19,071 | 20,204 | 17 | 81,757 | + 3,728 |
| Ballarat and Bendigo | Sept. 28 | 1,095 | 888 | 26 | 22,632 | — 515 |
| Brazilian St. Rly. Mlrs. | Sept. | 42,082 | 50,952 | 8 | 101,353 | + 18,853 |
| Brazilian Traction..... | Nov. 1 | 85,899 | 90,898 | 44 | 3,955,511 | + 68,968 |
| Brisbane ..... | October | 23,017 | 27,250 | 43 | 260 018 | + 55,907 |
| British Columbia ... $ | Sept. | 688,049 | 734,283 | 13 | 2,260,854 | + 247,268 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Bueno- Aires Lacroze . | October | 44,660 | 45,579 | 17 | 179,524 | + 7,426 |
| Calcutta.....Rs. | Nov. 8 | 58,922 | 65,104 | 45 | 28,92,032 | + 1,59,001 |
| Cape Town ..... | 8 pt. | ... | 11,290 | ... | ... | ... |
| Carthagena & Herreria | October | 2,376 | 1,582 | 43 | 26 213 | + 4,601 |
| Cordoba ..... | Sept. | 11,745 | 13,356 | 26 | 80,725 | + 8,456 |
| East India ..... | October | 1,911 | 1,878 | 13 | 5,911 | + 147 |
| Kalgoorlie..... | October | 2,955 | 2,652 | 43 | 29,099 | — 2,644 |
| La Plata..... | October | 5,008 | 4,920 | 43 | 50,431 | + 9,327 |
| Lima..... | Sept. | 24,060 | 34,110 | 39 | 300,647 | + 23,783 |
| Lisbon ..... Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Oct. 31 | 24,103 | 26,589 | 43 | 536,733 | + 38,117 |
| Melbourne ..... | October | ... | 65,000 | ... | ... | ... |
| Mexico ..... $ | October | 586,273 | 646,067 | 43 | 5,752,838 | + 187,633 |
| Montevideo..... | Sept. | 27 711 | 27,870 | 47 | 344,301 | + 26,483 |
| Para ..... | Nov. 9 | 4,194 | 3,864 | 49 | 196.202 | — 1,460 |
| Port Elizabeth..... | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai ..... $ | Nov. 5 | 21,503 | 23,800 | 44 | 977,599 | + 113.506 |
| Singapore ..... $ | Nov. 8 | 11,067 | 12,435 | 45 | 538,389 | + 70,167 |
| Toronto ..... $ | Sept. | 787,944 | 865,796 | 39 | 7,188,470 | + 962,426 |
| Winnipeg..... ..... $ | Sept. | 309,722 | 331,732 | 39 | 2,181,434 | + 243,882 |

## WANTED.

Copies of THE TRAMWAY AND RAILWAY WORLD for November 8, 1900, December 12, 1901, July 10, 1902, February 9, 1905, and December 6, 1906. Apply to the Publishers, Amberley House, Norfolk Street, Strand, London, W.C.

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**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks | 1912-13. | Increase or Dec |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation | Nov. 5 | £1,430 | £1,573 | + £74 | 23 | £38,606 | + £2,184 |
| Accrington Corp. | ,, 5 | 504 | 576 | + 72 | 31 | 18,155 | + 1,724 |
| Ayr Corporation | ,, 8 | 200 | 239 | + 39 | 25 | 11,541 | + 1 545 |
| Bath Electric | ,, 5 | 726 | 825 | + 99 | 45 | 43,981 | + 3 500 |
| Birkenhead Corp. | ,, 9 | 1,140 | 1,229 | + 89 | 32 | 41,070 | + 3,043 |
| Birmingham Corp. | ,, 8 | 11,055 | 12,314 | + 1,259 | 32 | 378,887 | + 32,156 |
| Blackburn Corporation | ,, 5 | 1 126 | 1,243 | + 123 | 32 | 43 010 | + 4 149 |
| Blackpool & Fleetwood | Oct. 25 | 341 | 467 | + 146 | 17 | 27 483 | + 4,607 |
| Blackpool Corporation | Nov. 6 | 527 | 784 | + 257 | 31 | 72,476 | + 11,683 |
| Bolton Corporation | ,, 9 | 2,530 | 2,585 | + 55 | 32 | 88 245 | + 5 154 |
| Bournemouth Corp. | ,, 12 | 1,502 | 1 720 | + 218 | 32 | 72,339 | + 8,622 |
| Bradford Corporation | ,, 8 | 5,463 | 5, 81 | + 1,18 | 32 | 191,958 | + 12 017 |
| Brighton Corporation | ,, 9 | 851 | 877 | + 26 | 32 | 37 916 | + 2 600 |
| Bristol | ,, 7 | 6,374 | 7,719 | + 1,145 | 44 | 360,327 | + 40.178 |
| British Elec. Federatn | ,, 7 | 37,724 | 51,485 | * | ... | ... | ... |
| Burnley Corporation | ,, 8 | 1,536 | 1,593 | + 57 | 32 | 55,296 | + 6,583 |
| Burton on Trent Corp | ,, 9 | 255 | 268 | + 13 | 32 | 9,407 | + 448 |
| Bury Corporation | ,, 9 | 1 279 | 1,298 | + 19 | 32 | 41,986 | + 1,788 |
| Cardiff Corporation | Oct. 25 | 2,508 | 2,579 | + 271 | 30 | 88,174 | + 9,121 |
| Chatham and District | Nov. 6 | 822 | 921 | + 99 | 44 | 41, 90 | + 2,637 |
| Chesterfield Corp. | Oct. 23 | 235 | 256 | + 21 | 29 | 7,7.6 | + 955 |
| Colne & Trawden | Nov. 8 | 257 | 247 | — 10 | 45 | 12,345 | + 762 |
| Cork Electric | ,, 6 | 473 | 488 | + 15 | 44 | 22 341 | + 585 |
| Croydon Corporation | Oct. 31 | 1,690 | 1,534 | — 115 | 31 | 51 581 | — 5 308 |
| Darlington Corporation | Nov. 8 | 222 | 243 | + 21 | 32 | 8 020 | + 800 |
| Derby Corporation | ,, 8 | 876 | 939 | + 63 | 32 | 31,851 | + 3,321 |
| Dover Corporation | ,, 8 | 202 | 211 | + 9 | 92 | 8,508 | + 184 |
| Dublin & Lucan | ,, 7 | 119 | 117 | — 2 | 18½ | 2,906 | — 26 |
| Dublin United | ,, 7 | 5 462 | 4,901 | — 562 | 44 | 246,004 | — 14,04[illegible] |
| Dundee City | ,, 5 | 1,169 | 1,324 | + 165 | 25 | 33,805 | + 2,533 |
| East Ham Corporation | ,, 8 | 1,036 | 969 | — 67 | 32 | 32,871 | - 1,420 |
| Exeter Corporation | ,, 7 | 294 | 319 | + 25 | 32 | 11,410 | + 581 |
| Gearless Mo or 'Buses. | ,, 8 | ... | 517 | ... | 31 | 15,551 | ... |
| Glasgow Corporation | ,, 8 | 19 206 | 20,601 | + 1,486 | 23 | 466 190 | + 34,335 |
| Glossop U. Elec. Supply | ,, 8 | 119 | 115 | — 4 | 45 | 5,852 | + 541 |
| Halifax Corporation | ,, 4 | 1,927 | 2,193 | + 265 | 31 | 68 115 | + 2,333 |
| Hastings & District | ,, 5 | 781 | 834 | + 53 | 31 | 47 829 | + 3,597 |
| Huddersfield Corp. | ,, 8 | 2,047 | 2,022 | — 25 | 32 | 68,883 | + 4,354 |
| Hull Corporation | ,, 8 | 3,002 | 3,121 | + 119 | 32 | 100 1 8 | + 5,512 |
| Ilford U.D.C. | ,, 8 | 369 | 445 | + 76 | 32 | 14, 87 | — 1,183 |
| Ilkeston Corporation | ,, 12 | 110 | 126 | + 16 | 33 | 4,435 | + 713 |
| Ipswich Corporation | ,, 8 | 368 | 347 | + 29 | 32 | 15,507 | + 642 |
| Isle of Thanet | ,, 8 | 335 | 364 | + 29 | 6 | 2,527 | + 257 |
| Kilmarnock Corp. | ,, 8 | 154 | 159 | + 6 | 25 | 4 549 | + 315 |
| Lanarkshire | ,, 6 | 1 568 | 1,851 | + 283 | 44 | 75,797 | + 9,625 |
| Lancashire United | ,, 5 | 1,344 | 1 610 | + 263 | 44 | 68 936 | + 8,841 |
| Leeds City | ,, 8 | 7,722 | 8,000 | + 287 | 32 | 236, 97 | + 17,278 |
| Leicester Corporation | ,, 8 | 2,543 | 2,765 | + 222 | 45 | 126,082 | + 11,742 |
| Leith Corporation | ,, 8 | 609 | 6 7 | + 68 | 25 | 18, 54 | + 872 |
| Leyton U.D.C. | Oct. 30 | 1,268 | 1,238 | — 30 | 30½ | 41,753 | — 621 |
| Liverpool Corporation | Nov. 8 | 12,461 | 12 969 | + 509 | 45 | 578,331 | + 43,622 |
| Llandudno & Colwyn B. | ,, 7 | 150 | 162 | + 8 | 49 | 17,211 | + 1 455 |
| London County Council | ,, 8 | 40 588 | 43 202 | + 2,614 | 31 | 1,329,346 | — 3 188 |
| London Gnl. Omnibus | ,, 8 | 58,403 | 50,900 | + 1,506 | 45 | 2,713,214 | + 407 682 |
| London United | ,, 7 | 5 484 | 6,043 | + 559 | 45 | 284 551 | + 5 494 |
| Lowestoft Corporation | ,, 8 | 172 | 196 | + 24 | 5 | 1 [illegible]24 | + 82 |
| Maidstone Corporation | ,, 6 | 167 | 196 | + 29 | 32 | 6,7 0 | + 411 |
| Manchester Corp. | ,, 8 | 16 907 | 17,110 | + 203 | 32 | 565,203 | + 28 562 |
| Met. Elec. Trys. | ,, 7 | 8 561 | 9,106 | + 575 | 45 | 407 [illegible]43 | + 13,877 |
| Nelson Corporation | ,, 8 | 191 | 178 | — 13 | 32 | 6 849 | + 348 |
| N'castle-on-Tyne Corp | ,, 8 | 4,515 | 5,012 | + 497 | 32 | 155 922 | + 14 617 |
| Newport Mon) Corp. | ,, 8 | 704 | 784 | + 80 | 32 | 24 744 | + 2 016 |
| New St Helens & Dist | ,, 5 | 698 | 773 | + 75 | 19 | 16,357 | + 1,807 |
| Northampton Corp | ,, 7 | 512 | 545 | + 33 | 32 | 18 808 | + 1,288 |
| Nottingham Corp. | ,, 6 | 3,081 | 3,327 | + 246 | 31½ | 106,825 | + 4,951 |
| Oldham Corporation | ,, 9 | 2,015 | 2 174 | + 159 | 33 | 74 379 | + 4,069 |
| Portsmouth Corp. | ,, 8 | 1,809 | 2 033 | + 230 | 32 | 76,968 | + 4,806 |
| Preston Corporation | ,, 5 | 802 | 856 | + 54 | 32 | 28 651 | + 1,824 |
| Provincial | ,, 8 | 1,524 | 1,698 | + 74 | 6 | 10,052 | + 714 |
| Reading Corporation | ,, 6 | 596 | 754 | + 158 | 31 | 22 320 | + 1,701 |
| Rochdale Corporation | ,, 8 | 1,520 | 1,550 | + 30 | 32 | 52,271 | + 2 168 |
| Rotherham Corp. | ,, 12 | 854 | 983 | + 126 | 32 | 32,56 | + 7,857 |
| Salford Corporation | ,, 10 | 4,881 | 5,0 6 | + 145 | 32 | 168 644 | + 6 915 |
| Sheffield Corporation | ,, 9 | 6,965 | 7,203 | + 238 | 33 | 240,135 | + 20 355 |
| Southampton Corp. | ,, 5 | 1,127 | 1,291 | + 164 | 31 | 43 000 | + 2,639 |
| Southend-on Sea Corp | ,, 5 | 5 2 | 756 | + 191 | 32 | 33,175 | + 5,704 |
| South Met. Trys. | ,, 7 | 775 | 1,124 | + 349 | 45 | 41,742 | + 3,655 |
| South Shields Corp. | ,, 8 | 620 | 677 | + 57 | 32 | 24,437 | + 2,925 |
| Sunderland Corp. | ,, 9 | 1,232 | 1 294 | — 38 | 32 | 47,123 | + 4 804 |
| Sunderland District | ,, 5 | 484 | 5 0 | + 76 | 1 | 56 | + 76 |
| Swindon Corporation | ,, 5 | 151 | 162 | + 11 | 31 | 5,312 | + 358 |
| Trys. (M.E.T.) 'Buses | ,, 8 | ... | 8,548 | ... | 41 | 215 331 | .. |
| TynesideTrys & Turrts | ,, 5 | 451 | 487 | + 36 | 19 | 10,136 | + 697 |
| Wallasey Corporation | ,, 8 | 1,024 | 1 004 | + 61 | 32 | 40 316 | + 3 811 |
| Walsall Corporation | ,, 8 | 581 | 632 | + 51 | 45 | 28,010 | + 2 0 3 |
| Walthamstow U.D.C. | ,, 8 | 627 | 722 | + 95 | 32 | 24,3 3 | + 584 |
| Warrington Corp | ,, 6 | 436 | 443 | + 7 | 32 | 14,109 | + 473 |
| West Ham Corporation | ,, 6 | 2,515 | 2 759 | + 244 | 31 | 86 4 7 | + 3,172 |
| Wigan Corporation | ,, 6 | 1,401 | 1 487 | + 86 | 31½ | 47 031 | + 4,7 9 |
| Wolverhampton Corp | ,, 12 | 980 | 1 051 | + 72 | 31 | 35,551 | + 2 012 |
| Yorkshire (W. Riding) | ,, 9 | 1 339 | 1 557 | + 223 | 45 | 65 986 | + 7 [illegible]9 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,497 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913 | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Nov. 8 | £5,560 | £5,120 | — £440 | 45 | £217 160 | + 26,343 |
| City and South London | ,, 8 | 3 140 | 2,707 | — 433 | 45 | 125 047 | — 12 079 |
| Liverpool Overhead | ,, 9 | 1 598 | 1 668 | + 70 | 45 | 77 176 | + 5,831 |
| London Electri | ,, 8 | 14,350 | 14 370 | + 20 | 45 | 660 755 | + 820 |
| Mersey | ,, 8 | 2 223 | 2 191 | — 32 | 45 | 100 57 | + 4,856 |
| Metropolitan | ,, 9 | 16 712 | 17 972 | + 1 260 | 45 | 773 217 | + 24,557 |
| Metropolitan District | ,, 8 | 13,654 | 13,455 | — 179 | 45 | 581,992 | + 17,423 |

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations. November 14. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. G'd. Bds. | ... | 70 — 75 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅝ — 4⅞ |
| 5 | Do. 5½% Cum 2nd Pref. | ... | 4⅜ — 4⅝ |
| 100 | Do. 4% Deb. Stk. Red | — 1 | 89½ — 91½ |
| 100 | Do 4½% Cum. Stk. Red. | ... | 97½ — 99½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 98½ — 100½ |
| 100 | Auckland Elec. Trams Co. Ltd. 5% 1st Mt. Db. Stk. Red | + 1 | 101 — 103 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — ⅞ |
| 1 | Do. 5% Cum. Pref | ... | 31 — 35 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock. Red. | ... | 70 — 75 |
| 100 | Birmingham Dis Pwr. & Trac. Co. Ltd. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| 10 | Bombay Elec Supply and Trams Co., 6% Cum. Pref | ... | 10¾ — 11⅛ |
| 100 | Do do 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | + 1 | 83 — 83 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 — 101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | — ¼ | 6½ — 7 |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 2½ | 115 —120 |
| 100 | Do. Pref. Ord. Stock | — 2½ | 102 —107 |
| 100 | Do. 5% Cum. Parpetual Pref. Stock | ... | 99 —102 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 97 —100 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —103 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. | + 1 | 91 — 94 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | + 1 | 87 — 90 |
| 100 | Do. 7% Non-Cum. Pref. | ... | 48 — 51 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 11 — 13 |
| 100 | Do. Deferred Ord. Stock | ... | 4 — 6 |
| 100 | Do. 5% Perpetual Debenture Stock | ... | 89 — 92 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 75 — 78 |
| 100 | B. Aires Port & City Trms 6% 1st Deb. Stk. Red | ... | 87 — 91 |
| 000 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb | ... | 98¼ —100½ |
| 5 | Calcutta Tramways Co., Limited Ord. | — ⅛ | 5⅞ — 6⅜ |
| 5 | Do. do. 5% Cum. Pref. | — ⅛ | 4⅛ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ltd. | — ⅛ | ⅞ — ⅞ xd |
| 10 | Carthagena and Hercerias Steam Tramways Co., Lim | ... | 3 — 3¼ |
| 1 100 | Do. 5% Debs. Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co (1904), Lim. | — ⅛ | 5⅛ — 5⅝ xd |
| 100 | Do. 4% Debenture Stock Red. 1935 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb | ... | 88 — 92 |
| 100 | Compañhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ½ | 94½ — 93½ |
| 10 | Corg Electric Tramways and Lighting Co. 5% Cum. Pref | ... | — 8⅝ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | — ⅛ | — 10¾ |
| 10 | Do. do. 6% Pref. | ... | — 12 |
| 100 | Do. do. "A" Red. | ... | — 82 |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 79 xd |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 9 1/32 — 9¼ |
| 10/- | Hastings & Dist. Electric Trams Co. Ld., Ord. | ... | ⅛ — 3/32 |
| 1 | Do. do. 6% Cum. Pref. | ... | ⅛ — ¾ |
| 100 | Do. do. 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 96½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds (Regd.) | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. | ... | 3½ — 4¼ |
| 10 | Do do 6% Cum Pref. | ... | 6½ — 6¾ |
| 100 | Do do 4½% Deb. Stock | ... | 76½ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2⅞ — 2⅞ |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd | ... | 0 — 1/16 |
| 100 | Do do 5% "A" Deb Stk | ... | 85 — 90 |
| 100 | Do do 6% "B" do | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 7/8 — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways 5% Prior Lien Deb | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1 — 1¼ xd |
| 1 | Do. 6% Cum. Pref. | ... | 1⅛ — 1⅜ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | ¼ — 3/8 |
| 100 | London General Omnibus Company, Limited 4½% Deb | ... | 95 — 97 |
| 100 | Do Do 5% Cum. Inc. Deb. Stk. Red | ... | 85 — 87 |
| 100 | London United Trms. (1901) Ltd. 4% 1st Mt Deb. Stk. Red | — 1 | 57 — 61 |
| 100 | Madras Electric Trams (1904), Lim., 5% Deb. Stk., Red | ... | 101 —103 |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¼ — 5⅛ |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | — 2 | 85 — 87 |
| $100 | Manila Electric R.R. and Ligh ing Corp. Capital Stk | + 1 | 107 —110 |
| $1,000 | Do. do. 5% Bds. | ... | 96½ — 98½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref | ... | 1/32 — 1½ |
| 100 | Metropolitan Elec Trms Ltd 4½% Deb Stock. Red. | ... | 83 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| $100 | Mexico Tramways Co. Common Stock | + ¼ | 78 — 82 |
| $500 | Do Gen. Con. 1st Mort. Gld Bonds | + 4½ | 78 — 82 |
| 100 | Do. 6% 50 yr Mort. Bonds | + 1 | 79 — 83 |
| ... | Michigan United Railways 5% 1st Mort. Gld Bonds | ... | 90½ — 92½ |
| 100 | Montreal Street Railway Sterling 4½% Debs. (1939) | + 2½ | 98 —100 |
| 100 | Do. 4½% Sterling Debs. (1922) | ... | 97 — 99 |
| 1 | National Steam Car Co. Ltd. | + 1/16 | 1⅜ — 1⅝ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 6 — 6½ |
| 10 | Do do 5% Cum. Pref. | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | + ⅛ | 5⅝ — 6⅛ |
| 5 | Do do 6% Cum. Pref. | ... | 4⅜ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams. Ltd., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co. Ltd. Ord | ... | 1/16 — 1/16 |
| 1 | Do. 5% Cum. Pref. | ... | 1/16 — 1/16 |
| 100 | Do. 4½% Debenture Stock. Red. | — 2 | 80 — 83 xd |
| 1 | Provincial Tramways Lim. Ord. | + 1/32 | 31/32 — 33/32 |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 82 — 85 |
| 5 | Rangoon Elec Trams & Supply Co. 8% Cum. Pref. | + 1/8 | 5⅛ — 5⅝ |
| 100 | Do do 4½% 1st Mt Db. Stk | ... | 97 — 99 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 83 — 85 |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | — |
| $500 | 1st Mt. 30 yr 5% Gold Bonds | ... | 93 —100 |
| 100 | 5% 5 yr. Mort. Gold Bonds | ... | 88 — 90 |
| 100 | Sao Paulo Tr. Light & Power Co. 5% Perp. Cons. Debs. | ... | 98 —101 |
| $500 | Do 5% 1st Mort Debs. Red 1939 | ... | 99 —102 |
| 10 | Shanghai Elec. Construction Co. | ... | 101½ — 111½ |
| 10 | Singapore Elec. Tramways Lim. 5% Debs. Red | ... | 84 — 90 |
| ... | South Met. Elec Trams and Ltg. Co., 6% Cum. Pref. | ... | 5/8 — ¾ |
| 100 | Do. do. 4% Deb. Stk. | ... | 68 — 73 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co. 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | — ½ | 85½ — 87½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4⅞ — 5⅛ |
| 5 | Do. do. 6% Cum Pref. | — ⅛ | 4⅞ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | — 1 | 97½ — 99½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co. Ord. | ... | ¼ — ⅜ |
| 5 | Do do 6% Cum Pref | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. | + 1 | 81 — 86 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 26. ] LONDON, SATURDAY, NOVEMBER 22, 1913. [ Established in 1892.

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Including sixty-four issues, of which twelve are large Illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### BOMBAY, BARODA, AND CENTRAL INDIA RAILWAY.

The Directors are prepared to receive, up to noon, on Tuesday, December 9, tenders for the supply of:—

Wheels and Axles and Wheel Centres.

Tenders must be made on forms, copies of which, with specification, can be obtained at these Offices on payment of 20s. each (which will not be returned).

The Directors do not bind themselves to accept the lowest or any tender.

C. CROMMELIN,
Secretary.

Offices: Gloucester House,
110, Bishopsgate, London, E.C.,
November 20, 1913.

### CROWN AGENTS FOR THE COLONIES.

The Crown Agents for the Colonies, acting on behalf of the Government of Nigeria, invite tenders for the supply of Acid Steel Rails, British Standard Section; also Sleepers and Keys for about 100 miles of permanent way at 45lb. per yard, and 40 miles at 60lb. per yard.

Forms of tender and all particulars may be obtained on application at the Office of the Crown Agents for the Colonies, Whitehall Gardens, London, S.W., between the hours of 10 a.m. and 4 p.m. (Saturdays 10 a.m. to 1 p.m.), on payment of a deposit of £1, returnable on receipt of a *bonâ-fide* tender for the whole or part of the supplies required.

Tenders to be delivered in sealed envelopes addressed to the Crown Agents for the Colonies, Whitehall Gardens, S.W., not later than noon on Tuesday, December 16, endorsed "Tender for Rails and Sleepers."

The Crown Agents do not bind themselves to accept the lowest or any tender.

### NORTH EASTERN RAILWAY COMPANY.

STOCKTON TO BILLINGHAM BECK BRANCH RAILWAY.

The Directors are prepared to receive tenders for the Construction of the above Branch Railway, about 3 miles in length, commencing by a junction with the Company's Leeds Northern Railway, near Stockton Station, and terminating by a junction with the Company's Billingham Beck Branch near Billingham Beck. The works comprise a double line railway with about 136,000 cubic yards of earthworks, and bridges, which require about 154 tons of steelwork, beams, etc. Plans may be seen, and specification, detailed quantities, and form of tender obtained on personal application at the office of Mr. C. F. Bengough, the Company's Engineer at York, on and after Monday, the 24th instant. Sealed tenders, marked "Tender for Stockton to Billingham Beck Railway," to be addressed to the Secretary, North Eastern Railway Company, York, not later than 9 a.m. on Monday, December 22, 1913. The Directors do not bind themselves to accept the lowest or any tender.

R. F. DUNNELL,
Secretary.

York, November 18, 1913.

### COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply and delivery of the following:—

A. 1. Car Bodies and Trucks.
2. Electrical Equipments for Cars.
B. 3. Points and Crossings.

Specifications, general conditions, and tender forms may be obtained from the undersigned.

Sealed tenders, endorsed (1) "Car Bodies and Trucks," (2) "Electrical Equipments," (3) "Points and Crossings," must be delivered to Higson Simpson, Esq., Town Clerk, West Hartlepool, not later than noon on Wednesday, December 3.

The Corporation do not bind themselves to accept the lowest or any tender.

CHAS. BURGESS,
General Manager and Engineer.

Tramway Depôt,
Greenland, West Hartlepool,
November 19, 1913.

### SEVENOAKS URBAN DISTRICT COUNCIL.

TO MOTOR ENGINEERS.

The Urban District Council of Sevenoaks hereby invite tenders for the supply of

(a) A Motor (about 30 horse-power) Hose Cart, to carry 6 men, hose, and appliances, and
(b) A Petrol Motor Fire Engine fitted with Pumps of 150 and/or 200 gallons capacity, 30 feet of Telescopic Ladders, 40 feet of Suction Hose, and the usual accessories, rendering the Machine ready for immediate use.

No specification will be issued, but makers are to supply their own in full detail.

Tenders to be addressed to the "Chairman of the Special Fire Committee," Council Offices, Argyle Road, Sevenoaks, and to be delivered by 12 noon on the 28th day of November, 1913.

Neither the lowest nor any tender will necessarily be accepted.

By order, F. W. TIPTON,
Clerk of the Council.

November 15, 1913.

### METROPOLITAN BOROUGH OF SHOREDITCH.

ELECTRICITY DEPARTMENT.

The Council of the Metropolitan Borough of Shoreditch are prepared to receive tenders for the following:—

Sub-Station Plant, comprising Transforming and Converting Plant, together with the necessary starting and controlling apparatus and connections.

General conditions, specification, drawings, form of tender, and form of agreement may be obtained from the undersigned on and after the 20th day of November, 1913, on making a deposit of five guineas, which sum will be refunded to *bonâ-fide* tenderers after the tenders have been adjudicated upon, provided that such tender has been duly delivered in the manner described below, and shall not have been withdrawn. Extra copies of the specification may be obtained by *bonâ-fide* tenderers at a charge of one guinea per copy, which sum will not be refunded.

Tenders must be placed in envelopes endorsed "Tender for Electricity Works," and sealed with sealing wax, and must be delivered by the persons tendering or their authorised representative to the Town Clerk, Town Hall, Old Street, Shoreditch, London, N., not later than noon on Tuesday, December 16, 1913.

The Council do not bind themselves to accept the lowest or any tender, or to proceed with the work unless they are able to obtain from the London County Council sanction to the necessary loans upon terms which may be acceptable to the Shoreditch Borough Council.

C. NEWTON RUSSELL.

Shoreditch Electricity Dept.,
Coronet Street, Shoreditch, N.

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## CITY OF NOTTINGHAM.

The Tramways Committee are prepared to receive tenders for the supply and delivery of .—

(1) 750 Tons of Steel Tramway Rails.
(2) 21 Tons of Steel Tie-Bars.
(3) Steel Tramway Poles.
(4) Cast Iron Pole Fittings.
(5) Malleable and Wrought Iron Pole Fittings.

Drawings may be seen, and copies of the specifications and forms of tender obtained on applying to Mr. Arthur Brown, M.Inst.C.E., City Engineer, Guildhall, Nottingham, on payment of a deposit of one guinea in each case, which will be returned on receipt of a *bonâ-fide* tender and the copy of the specification.

Sealed tenders, in the official envelopes provided, are to be delivered to the undersigned not later than Monday, December 1, 1913.

The lowest or any tender will not necessarily be accepted, and the Committee reserve to themselves the right to divide the work.

Tenders will only be accepted from firms who conform to the conditions of the contract as regards paying the local standard rate of wages, etc.

By order, W. J. BOARD,
Town Clerk.

Guildhall, Nottingham,
November 18, 1913.

## BOROUGH OF SOUTHEND-ON-SEA.

TO CONSTRUCTIONAL ENGINEERS AND CONTRACTORS.

PIER TRAMWAY.

The Corporation of Southend-on-Sea is prepared to receive tenders for the supply and erection of Castiron Piles, Compound Girders, Joists, and incidental Works and Materials required in connection with the Extension of a Tramway Passing Place, and the Provision of a New Siding, on Southend-on-Sea Promenade Pier.

Plans may be inspected, and specification, bill of quantities, and form of tender obtained, on application to the Borough Engineer, Mr. Ernest J. Elford, M.Inst.C.E., on and after Thursday, November 20, on payment of a deposit of two guineas, which will be refunded on receipt of a *bonâ-fide* tender on the form supplied, and the return of all documents.

Sealed tenders, endorsed "Pier Tramways," and addressed to the undersigned, must be delivered by 9 a.m. Thursday, December 4.

The Corporation do not bind themselves to accept the lowest or any tender.

By Order, H. J. WORWOOD,
Town Clerk.

Town Clerk's Office, Southend-on-Sea,
November 17, 1913.

## BURGH OF LEITH.

TRAMWAYS EMPLOYEES' UNIFORMS.

The Town Council invite tenders for the supply of Summer Uniforms, Factory or Tailor made, as may be determined—conform to sample cloth and suits, to be seen at the Tramways Offices, 165, Leith Walk, and to relative conditions of contract.

Particulars may be obtained from the Tramways Manager there.

Tenders (endorsed "Tramways Uniforms"), with separate sample of cloth, marked with a private mark which shall not be recognisable until the tenders are opened, must be lodged with me not later than December 15 next.

The lowest or any tender may not necessarily be accepted.

D. ROBERTSON,
Town Clerk.

Town Clerk's Office, Leith,
November 19, 1913.

*(Continued on page 465.)*


SIMPLEX CONDUITS, Ltd.
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
500 page Catalogue sent free on request.

POLE PAINTS
which keep their colour and prevent rust. Kearsley's ready-mixed Pole Paints are used by important Tramway Companies the world over, and give entirely satisfactory results under extreme climatic conditions.
Robert KEARSLEY & Co., Ltd.
RIPON, England.

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON."
Telephone: 368, LONDON WALL.

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CAR VARNISH
SEND TO
PINCHIN JOHNSON & CO., Ltd.,
MINERVA HOUSE,
BEVIS MARKS, LONDON, E.C.

The "Peacock" Improved Brake.
THE "PEACOCK" BRAKE CO.,
27, CLEMENTS LANE, LONDON, E.C.
Telephone No.: 5735 CENTRAL.
Telegraphic Address: "INBRAKE," LONDON.
British, Foreign and Colonial Representatives:—
BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peaboly Rice, 21, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

**Established in 1892 and Published by**

*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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SATURDAY, NOVEMBER 22, 1913.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

## FARE QUESTIONS.

Less attention than usual was bestowed during the municipal elections upon tramway questions. In part this may have been due to the fact that in the cases of several of the largest undertakings matters relating to concessions were already under consideration, and reports may shortly be expected dealing with the increase of penny distances and an extension of the period during which workmen's tickets are issued. These are matters that cannot well be avoided on systems where prosperity is increasing year after year, with the result that larger sums are allocated to the relief of the rates. Another factor that has doubtless forwarded these proposals is the reduction of fares in London under the stress of omnibus competition, although similar concessions have not yet been granted by the owners of the latter vehicles. No provincial tramway, however, has followed the example of the London County Council in issuing return tickets after the workmen's car hours. This is a matter to which attention might well be devoted, in view of the convenience thereby conferred upon the passengers. The conductors, too, are enabled to get through their work on the return cars with less trouble, though it must be admitted that they have to carry a larger stock of tickets and are detained longer at the depôts for the checking of their accounts unless a larger staff of checkers are employed. At Birmingham the Committee have under consideration a memorial in favour of halfpenny fares, and, by direction of the Corporation, they are also deliberating upon a proposal for issuing workmen's tickets up to 8.30 a.m. instead of to 8 o'clock. At a meeting at Aston, where the chairman of the Tramways Committee addressed the ratepayers, a resolution was carried in favour of penny return tickets for half stages and for the issue of transfer tickets. To the demand for halfpenny fares Mr. Harrison Barrow replied that he believed halfpenny fares would result in a loss, but he admitted that a trial would be necessary to prove such contention. Mr. Barrow is a little inaccurate, however, in stating that no large cities in this country have adopted transfers. A number of cases might be cited, notably that of London, where return transfer tickets are also issued. The halfpenny fare question has also been under consideration at Salford, where a previous trial proved unsuccessful. The Tramways Committee have agreed to recommend that no halfpenny fares be granted, except on the shorter routes, where a penny return fare will be instituted, instead of making the single journey a halfpenny fare. It is intended to fix the maximum fare at a penny on all routes in the borough, so that passengers from Deansgate to Kersal Bar, who now pay a three-halfpenny fare, will be able to travel for a penny. A somewhat preposterous suggestion has been submitted to the Bury Tramways Committee. It is to the effect that the time during which workmen's tickets are available should be extended for the benefit of people who work overtime. The manager is engaged in obtaining information on the subject from other towns. At Glasgow the Socialist element utilised the elections for agitating in favour of further concessions now that the extension of the halfpenny stages has not brought about any great diminution of the annual balance. Notwithstanding that the Socialists' scheme for utilising the surplus for the erection of municipal cottages has been rejected, they are reported to be concentrating upon an attempt to earmark future surpluses for that purpose.

## BREAKDOWNS AND STREET OBSTRUCTION.

The by-law adopted by London County Council on Tuesday last in regard to obstruction of traffic caused by the breakdown of vehicles in the streets should result in much advantage to the working of metropolitan tramways. Local authorities have powers under section 23 of the Municipal Corporations Act, 1882, and section 16 of the Local Government Act, 1888, to make by-laws dealing with such obstruction. The decision of the County Council to approve a by-law of the kind is an example of the way in which some needed reforms can be carried out without new legislation, and also of the fact that some of the proposals put forward by the recent Select Committee of the House of Commons on motor traffic can be given effect to by administration. That Committee in their report stated that they regarded the presence in crowded streets of vehicles that were structurally unsound as a serious menace to public safety, and they considered it desirable that a by-law should be framed imposing penalties on any owner or driver who knowingly sent or took an unsound vehicle into the streets. The Local Government Committee of the Council apparently lost no time in directing their attention to this matter, and they entered into communication with the Home Secretary on the subject. After negotiations with him the terms of a by-law were adjusted, giving effect to the proposal of the Parliamentary Select Committee, and as it has been adopted by the Council it will presumably come into force immediately. The maximum penalty provided is 40s., and there is a saving clause to the effect that no person shall be convicted if he satisfies the Court that he had taken all reasonable means to maintain the vehicle in proper condition or to prevent its being over-

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loaded, or in the case of the driver that he was unaware of its defective or overloaded condition. The penalty clause applies to overloaded vehicles which break down as well as to those in a defective condition. The evil arising from the breakdown of vehicles on streets within the Metropolitan police district is much more acute than it is in any other town in the country. The tramway authority in any place outside of London freely exercises the power of immediately removing vehicles broken down on the tramway tracks to the sides of the roads, so that the tramway traffic may suffer the least possible interruption. In some of the larger towns, in fact, there is what may be called a breakdown gang organised on fire brigade principles so far as regards speed and being on the spot in the least possible time. But in London the Commissioner of Police has strong objections to the tramway authority moving a broken-down vehicle until it has been inspected by a police officer sent for the purpose. This, it is said, has sometimes caused a delay of an hour or more. It is to be expected that the liability of a penalty will discourage the sending out of defective vehicles, and what is perhaps even a more practical consequence, the sending out of vehicles with such loads that they break down. No doubt the enforcement of the by-law will sometimes lead to prolonged hearings before the magistrates. It will, for instance, be possible for the owner of the vehicle to allege that the breakdown was caused by a tramway rail being above or below the level of the adjacent paving, or to plead that the vehicle was not in a defective state before the breakdown occurred. In the case of alleged overloading the question as to what load a vehicle could safely carry, and as to what the actual weight of the load was at the time when the breakdown occurred, will have to be determined by evidence. Nevertheless, there can be no doubt that the working of the by-law will be beneficial, both to the tramway undertaking and to general street traffic.

## ELECTRIC TRACTION AND OMNIBUS BILLS FOR 1914.

The following are abstracts of the Parliamentary notices of some of the private Bills for next session relating to tramways, electric railways, and omnibuses. The notices may be published at any time before the end of this month, so that a good many others will probably fall for inclusion in our next issue.

BIRKENHEAD CORPORATION.—To enable the Corporation to run motor omnibuses in the borough and in neighbouring districts, and to acquire lands and erect buildings and shelters for the purpose. Solicitor—James Fearnley, town clerk, Birkenhead. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

BRISTOL CORPORATION (TRAMWAYS).—To empower the Corporation to work any tramways within or outside the city of Bristol which they may hereafter acquire or construct or which may be leased to them, and to enter into agreements with the Bristol Tramways and Carriage Company or other body for purchase, leasing, or working by the Corporation of tramways whether the tramways are compulsorily purchasable by the Corporation or not. Solicitor—E. J. Taylor, town clerk, Bristol. Parliamentary agents—Dyson and Co., Caxton House, Westminster.

CENTRAL LONDON RAILWAY.—To authorise the company to enlarge their tunnels under Holborn, to make subways at Shepherd's Bush, Oxford Circus, and the Bank of England, to acquire lands, to raise additional capital, and to issue warrants to bearer. Solicitors—Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, E.C. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

CLECKHEATON URBAN DISTRICT COUNCIL.—*Inter alia* to enable the Council to run motor omnibuses within the district and outside of it on two routes to connect with termini of the Yorkshire (Heavy Woollen District) Tramways at Liversedge and Gomersal. Solicitors—J. H. Linfield, clerk to the Council, and Clough and Crabtree, Cleckheaton. Parliamentary agents—Torr, Durnford and Co., 2, Millbank House, Westminster.

GLASGOW CORPORATION (WATER, TRAMWAYS, ETC.)—To authorise the Corporation, among other things, to construct numerous additional tramways, largely consisting of suburban extensions and including lines extending as far as Milngavie and Coatbridge, to give to the Corporation running powers over part of the lines of the Airdrie and Coatbridge Tramways Company, to authorise new streets and street improvements, and to enable the Corporation to run omnibuses. The total length of tramways proposed is 21 miles 30 chains, practically all double track. Solicitor—J. Lindsay, town clerk, Glasgow. Parliamentary agents—Martin and Co., 27, Abingdon Street, Westminster.

LONDON COUNTY COUNCIL (TRAMWAYS AND IMPROVEMENTS).—To enable the Council to construct four lengths of tramways, including Charles Street to Ludgate Circus, Aldgate to near Mark Lane, Aldgate terminus to Aldgate station, and Lee Green to Eltham; to widen streets, to acquire lands, and to provide for the working by the Council of certain portions of tramways recently acquired or about to be acquired. Solicitor—Laurence Gomme, clerk of the Council, County Hall, Spring Gardens, S.W. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

LONDON ELECTRIC RAILWAY.—To authorise the company to construct subways at Tottenham Court Road, Piccadilly Circus, and Trafalgar Square, to acquire lands, to raise additional capital, to increase the rate of interest on unissued preference stock, and to issue stock certificates to bearer. Solicitors and Parliamentary agents—Bircham and Co., 46, Parliament Street, Westminster.

LONDON UNITED TRAMWAYS.—To empower the company and any other company or any local authority owning or working tramways to enter into agreements with regard to the leasing, working and maintenance of the tramways or light railways of the contracting parties, the interchange of traffic, the supply of rolling stock and motive power and the apportionment of tolls; to authorise through tickets and bookings, and the postponement of the time of purchase of tramways, to enable any local authority to lease tramways to the company, to enable the company to carry excess passengers in the cars, and to run coupled and trailer cars, reserved cars and cars for special purposes. Solicitors—Stanley, Washbrough, Doggett and Baker, St. Stephen's House, Westminster. Parliamentary agents—Dyson and Co., Caxton House, Westminster.

MIDDLESEX COUNTY COUNCIL (WESTERN ROAD AND IMPROVEMENTS AND FINANCE).—To authorise the Council to make a new roadway from a junction in the parish of Heston with the Bath Road to a junction with High Road, Chiswick, a widening of Syon Lane in the parish of Isleworth, and a new road in that parish from a junction with Syon Lane to the junction of London Road with Twickenham Road at Busch Corner. It is also proposed to acquire lands and buildings, to prohibit the use of the new roads for the purpose of tramway, light railway, trolley vehicle, motor and other omnibus service and to provide that no application shall be made for powers to work any such service or to construct any tramway or light railway on the new roads except with the consent of the Council, and to empower and if thought fit to require the Brentford and Heston and Isleworth Urban District Councils to construct and maintain or to contribute to the cost of construction and maintenance of the new roads or parts of them. Solicitor—E. S. Ficeland, 46, Queen Anne's Gate, Westminster. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

NEWPORT CORPORATION.—To authorise the Corporation among other things to construct additional tramways, to build a new bridge across the River Usk, and to run motor omnibuses within and beyond the borough. Solicitor—A. A. Newman, town clerk, Newport (Mon.). Parliamentary agents—Rees and Freres, 5, Victoria Street, Westminster.

## L.C.C. TRAMWAY MATTERS.

BREAKDOWN OF ROAD VEHICLES.

At last Tuesday's meeting of the London County Council the Local Government, Records, and Museums Committee reported that they had been considering the advisability of the Council making a by-law under section 23 of the Municipal Corporations Act, 1882, and section 16 of the Local Government Act, 1888, dealing with obstruction to traffic caused by the breakdown of vehicles. The House of Commons Committee on Motor Traffic in their report recently issued stated that they regarded the presence in crowded streets of vehicles that were structurally unsound as a serious menace to public safety, and they considered it desirable that a by-law should be framed imposing penalties on any owner or driver who knowingly sent or took an unsound vehicle into the streets. The Local Government Committee now recommended the adoption of a by-law for the county of London which they understood the Home Secretary would be prepared to allow. The by-law provided that in any case where a vehicle breaks down and causes obstruction to traffic, and the breakdown is due to the defective condition of the vehicle or to its being overloaded, the owner or any other person who caused or permitted it to be used and the driver shall be guilty of an offence, and shall be liable to a penalty not exceeding 40s. A provision is added that no person shall be convicted if he satisfies the Court that he had taken all reasonable means to put and maintain the vehicle in proper condition or to prevent its being overloaded, or, being the driver, that he was unaware of its defective or overloaded condition.

The report was adopted without discussion.

A COSTLY STREET WIDENING.

The Improvement Committee submitted a report of a scheme for the widening of High Street, Wandsworth, and East Hill in connection with the construction of a tramway from York Road to East Hill. It was proposed that the widening of the streets should be carried out in sections as properties for the purpose were acquired. The total estimated cost for the widenings and the property was £73,000, and it was recommended that the improvement should be undertaken at an early date. The Wandsworth

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Borough Council had agreed to contribute one-third of the net cost. The Finance Committee mentioned that the County Council's share of the net cost would be £45,667, involving yearly debt charges amounting at their maximum to £2,700, and decreasing by £31 a year. Consideration of the matter was adjourned.

MOTOR CARS FOR THE TRAMWAY DEPARTMENT.

The Highways Committee reported that the following tenders had been received for the supply of six motor cars required for use in the tramway department, and for the purchase of the six cars now used :—

| | With non-detachable wheels. | With detachable wheels. | Price offered for the six cars at present in use |
|---|---|---|---|
| | £ s. | £ | £ |
| Enfield Autocar Co. .. .. | 1,986 0 | 1,986 | 210 |
| Singer Motor Co. .. .. | —— | 2,538 | 240 |
| Austin Motor Co. .. .. | 2,649 15 | 2,748 | 225 |
| Wolseley Tool & Motor Car Co. | 2,718 0 | 2,706 | 60 |

The estimate of the chief officer was £2,000. The Highways Committee proposed that the Council should accept the tender of the Enfield Autocar Company, and this was agreed to.

INCREASE OF WAGES.

The Highways Committee reported that the Rolling Stock Conciliation Board had considered an application for an increase of 1d. an hour in wages by fitters, turners, millwrights, toolmakers, slotters, planers, blacksmiths, hammermen, and the various classes of machine makers employed in the tramway department. An agreement was arrived at by the Board the effect of which was that the men of each grade should receive an increase of ½d. per hour, with a further increase of ½d. an hour to take effect a year later. The agreement was to remain in force for two years. Additional expenditure of £400 would be incurred in respect of the remainder of the current financial year, while the increased expenditure during 1914-15 would be £1,900, and during 1915-16 and each subsequent year on the present establishment, £2,831.

The Rolling Stock Conciliation Board had also considered applications as to increase of pay of car washers, and grading and rates of pay of controlier repairers and light and power attendants in the tramway department. The car washers had applied for an increase of 3s. a week, the present rate of pay being from 27s. 6d. to 30s. a week. The controller repairers were paid 7d. to 8d. an hour, and light and power attendants 7d. an hour, and they had asked for a flat rate of 8d. an hour. Last March the Council had approved an agreement under which those employees were to be graded as traction wiremen, and were to be paid 8d. an hour. It was not, however, found possible to give effect to this arrangement. The Conciliation Board considered these matters on October 29 last, and an agreement on all points was arrived at. Its effect was that regular washers were to be paid 30s. a week. There were 554 men already in receipt of this rate, and some of those had received it for twelve months or more. It was proposed that these employees should be paid an extra 1s. a week, such extra payment to be personal to such employees. With regard to the controller repairers and light and power attendants, it was proposed that they should be paid 8d. an hour, and continue to be designated as at present. The agreement would involve additional expenditure of £1,062 during the remainder of the current financial year, and increased expenditure of £3,070 during 1914-15 and each subsequent year.

The Committee pointed out that the rate of pay of plumbers in the building trades was increased from 11d. to 11½d. an hour on September 22 last and increased to 1s. an hour on October 27. The Committee understood that it was the custom for plumbers and plumber jointers (electrical trades) to be paid the same rate, and they accordingly proposed that the rate of pay of the plumber jointers in the tramway department should be increased from 11d. to 1s. an hour. The arrangements thus made by the Committee were approved.

THE USE OF TRAMWAY SHELTERS.

Replying to Mr. J. D. Gilbert, Mr. G. H. Hume, vice-chairman of the Highways Committee, said that the Committee had come to the conclusion that no further action should be taken in regard to the proposed tramway shelter at Kennington Gate. The service of cars here was so frequent that there was little or no waiting. The services of the motor 'buses were less frequent, and the shelter would probably be used by 'bus passengers. It was also found that in wet weather the shelters were used by pedestrians, and it was not reasonable to provide such public accommodation out of the tramways account.

APPLICATION FOR MORE TRAILER CARS.

Mr. Hume, in reply to a question, said that there were eight trailer cars in use in London, and the Committee were most anxious to get the sanction of the Board of Trade to a larger number. The Board were now being approached.

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**Dundee Tramwaymen and Indigestion.**—In connection with the trial of the new relief duties now being made at Dundee, the car employees on November 14 sent a deputation to place their complaints before the Tramways Committee. The deputation admitted that the spread-over time had been curtailed, but said their day was more broken up than it had been. Their meal times were shortened. The night men were particularly hard hit. It was asserted that indigestion had become prevalent owing to the irregular meal hours. The committee agreed that three representatives of the men should be asked to meet the manager and the chairman of the committee, to draw up a time table to meet the wishes of the men. An estimate will then be presented of the cost of carrying it out.

## TRAMWAY CHAIRMEN FOR 1913-14.

The reorganisation of the Town Councils after the annual November elections is now being completed. In the great majority of cases the chairmen and vice-chairmen of the various Tramway Committees have been re-appointed for the ensuing year, as will be seen from the following list which is continued from last week.

| Town. | Chairman. | Vice-Chairman |
|---|---|---|
| Barking .. .. | Councillor A. E. Martin .. | —— |
| Bexley .. .. | Councillor T. Rattenbury .. | —— |
| Blackpool .. .. | Alderman Brodie .. .. | Councillor Holt. |
| Bolton .. .. | Alderman J. Miles .. .. | *Councillor P. Higson. |
| Bootle .. .. | Councillor Booth .. .. | Councillor Pennington. |
| Burnley .. .. | Councillor E. Heap .. .. | Councillor Irving |
| Bury .. .. | Alderman T. S. Collinge .. | Councillor Hargreaves. |
| Cardiff .. .. | Alderman Sir J. W. Courtis .. | *Councillor A. J. A. Stone. |
| Colchester .. .. | Councillor A. M. Jarmin .. | Councillor J. T. Bailey. |
| Croydon .. .. | *Alderman Allen .. .. .. | Councillor Pelton. |
| Darwen .. .. | Alderman J. Tomlinson .. | Councillor G. P. Holden. |
| Devonport .. .. | Alderman J. C. Tozer .. .. | Councillor J. F. Cole. |
| Douglas .. .. | *Councillor J. Kelly .. .. | —— |
| Edinburgh .. .. | Councillor J. Harrison .. .. | —— |
| Erith .. .. | Councillor G. C. Humphreys .. | —— |
| Exeter .. .. | *Councillor T. Linscott .. .. | *Alderman H. B. Varwell. |
| Farnworth .. .. | Councillor W. B. Richardson .. | —— |
| Glasgow .. .. | Councillor R. Kirkland .. | Councillor Jas. Alston. |
| Gloucester .. .. | *Councillor J. O. Roberts .. | *Councillor C. J. Ramstedt. |
| Haslingden .. .. | Councillor Waddington .. | *Councillor Haworth. |
| Heywood .. .. | Councillor J. Ashworth .. | Alderman T. Popple. |
| Huddersfield .. .. | Alderman J. H. Aston .. | *Councillor J. Barlow. |
| Hull .. .. | Counc. J. H. Hargreaves (Mayor) | Councillor W. Wheatley. |
| Ilford .. .. | Councillor R. Stroud .. .. | Councillor J. Deveson. |
| Kilmarnock .. .. | Councillor Finlay .. .. | —— |
| Kirkcaldy .. .. | Councillor Fergusson .. .. | —— |
| Lancaster .. .. | Councillor Wilkinson .. .. | —— |
| Leith .. .. | Judge Hall .. .. .. | —— |
| Leyton .. .. | Councillor H. Heather .. .. | —— |
| Lincoln .. .. | Alderman W. S. White .. | Councillor M. A. Ashley. |
| Liverpool .. .. | Alderman F. Smith .. .. | Major R. J. Clarke. |
| Lowestoft .. .. | Councillor F. Spashett .. .. | —— |
| Luton .. .. | Alderman Wilkinson .. .. | —— |
| Maidstone .. .. | Councillor Lyle .. .. .. | Councillor Green. |
| Manchester .. .. | Alderman J. Bowes .. .. | Councillor A. W. Chapman |
| Nelson .. .. | Councillor W. F. Cooke .. | —— |
| Newcastle .. .. | Alderman J. H. Rodgers .. | Councillor R. Mayne. |
| Northampton .. .. | Councillor T. D. Lewis .. | Councillor W. Beale. |
| Nottingham .. .. | Councillor R. H. Swain .. | Alderman F. R. Radford. |
| Perth .. .. | *Councillor Calderwood .. .. | —— |
| Portsmouth .. .. | Alderman J. H. Corke (Mayor) | Councillor J. Timpson. |
| Preston .. .. | *Alderman J. Ormrod .. .. | *Councillor T. Parkinson. |
| Radcliffe .. .. | Councillor Walker Allen .. | —— |
| Rawtenstall .. .. | Alderman H. Coupe .. .. | *Councillor J. W. Stansfield |
| Reading .. .. | Alderman C. G. Field (Mayor) | —— |
| Rochdale .. .. | *Alderman Taylor .. .. | —— |
| Rotherham .. .. | Alderman D. L. Winter .. | Councillor T. Reeves. |
| Southampton .. .. | Alderman F. A. Dunsford .. | —— |
| South Shields .. .. | Alderman W. G. Wylie .. | Alderman J. W. Henderson (Deputy Mayor). |
| Stockport .. .. | Alderman C. Sharples .. .. | Alderman W. E. Hammett. |
| Sunderland .. .. | Councillor G. New .. .. | Councillor W. Walker. |
| Wallasey .. .. | Alderman J. Farley .. .. | Councillor W. Eastwood. |
| Walsall .. .. | Alderman J. Cope .. .. | Alderman J. Williams. |
| Walthamstow .. .. | *Councillor E. Samuels .. .. | —— |
| Warrington .. .. | *Councillor Dr. G. W. Joseph .. | Councillor J. Wilkinson. |
| Wigan .. .. | *Councillor R. Fletcher .. .. | *Councillor J. Walkden. |
| York .. .. | Alderman S. W. Meyer .. | Councillor S. H. Davis. |

*Denotes a change in the chairmanship or vice-chairmanship.

## MISCELLANEOUS NEWS AND NOTES.

**Enlargement of a Leeds Depot.**—The Beckett Street tramways depôt is to be enlarged at a cost of £7,500.

**Railless Trolley Traction for Japan.**—A company is being formed at Tokio to introduce railless trolley car services in six of the principal towns of Japan.

**Fire Alarms on Tramway Standards.**—Southampton Tramways Committee have refused to allow the Fire Brigade Committee to use the tramway standards for carrying wires for fire alarms.

**More Railless Cars for Ramsbottom.**—The Town Council have agreed to the Tramways Committee obtaining two additional cars for the railless trolley service. A sub-committee will visit the works of the various makers.

**Railless Traction and Motor Omnibuses for Launceston.**—The City Council of Launceston (Tasmania) have adopted a scheme providing for the running of railless trolley and motor omnibus services, and for the borrowing of £30,000 for tramway purposes.

**Responsibility for Track Maintenance.**—As the result of a discussion on the question whether the general manager's department or the city surveyor is responsible for the maintenance of the tramway track the Belfast Tramways Committee have requested Mr. Nance to obtain information as to the procedure adopted by other municipalities.

**Double-Deck Trolley Car Sanctioned.**—A double-deck trolley car, similar in appearance to an omnibus but having two trolley arms on top, has been sanctioned by the Board of Trade for use on the through railless trolley system to be installed in Brighton and Hove. The car was constructed by the Brush Company, accommodates 34 passengers, and weighs just under four tons unloaded.

**Offer of Omnibuses to Oxford.**—The National Electric Construction Company have made an offer to drop the tramway electrification proposals and to substitute a motor omnibus service, paying the Corporation £500 a year as rent. In return they ask the Council to pay £20,000 for the existing horse tramways, excluding horses, cars, etc., the rails to be taken up. The Tramways Committee have recommended the acceptance of the offer, provided the company pay £800 a year rent, the sum payable by the Corporation to be reduced to £15,000. The General Purposes Committee have decided against the recommendation.

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**Messrs. Watlington and Company, Limited,** of Britannia House, Milton Street, London, E.C., notify that their telephone number has been altered to City 1257 (2 lines).

**Reduction in London Tramway Assessment.**—The rateable value of the London County Council tramways lines in the borough of Deptford has been reduced from £12,263 to £2,250 in consequence of the falling off in the receipts of the tramways, attributed, among other things, to omnibus competition.

**Dinner Hour Fares.**—Colchester Council has agreed to allow workmen at Hythe to travel at workmen's fares during the one o'clock dinner hour between Hythe terminus and Osborne Street, the return fare being one penny. The Tramways Committee have permitted return tickets on the North Hill and Recreation Ground routes to be likewise available on the Hythe route between North Hill and Wimpole Road, and *vice versâ*.

**Brighton Councillors and Free Passes.**—In view of the equal voting at a meeting of the Town Council on the subject of free tramway passes being granted to members, a petition was signed in favour of the committee again considering the matter. The committee have informed the memorialists that they do not deem it advisable to comply with the suggestion that each member of the Council should be supplied with a free pass.

**Trail Cars Suggested for Derby.**—In reply to questions at a meeting of the Council on November 13, Councillor Dean, deputy chairman of the Tramways Committee, said that with the assistance of the manager of the tramways, the committee were preparing a revised scale of fares. They were negotiating for wind screens, whilst boxes were to be put on the cars for the tickets of passengers as they were leaving. He did not think they would run longer cars, but they might run trailer cars.

**Platform Screens at Birkenhead.**—A wind screen, partly of glass and partly of celluloid, which folds up easily and can be let down by means of a catch, is being experimented with on the Birkenhead tramcars. There appears to be a divided opinion among the motormen as to the merits of the appliance.

**Warnings Against Unguarded Hatpins.**—In consequence of a painful accident which has occurred amongst a number of women who were shopping in a Manchester street, the Tramways Committee have decided that notices calling attention to the dangers of unprotected hatpins, both to passengers and conductors, should again be placed in the tramcars. Since notices were last displayed the inspectors have reported from time to time that the womenfolk were becoming more careful in the matter.

**Litigation Concerning Current Supply.**—December 9 is the date fixed for the trial of a motion by Sunderland District Electric Tramways, Limited, to restrain the Newcastle-upon-Tyne Electric Supply Company and the County of Durham Electric Power Supply Company from cutting off plaintiff company's supply of electric power, and so stopping the running of their tramcars. It appears that there is a dispute as to the price.

**Railless Trolley Cars for a Newcastle Bridge.**—The North Eastern Railway Company propose to apply for powers to run trolley cars in Newcastle and Gateshead in order to run a car service across the high-level bridge, the powers being needed for the alighting stations at either end of the bridge. For a number of years private companies have run omnibuses across the bridge, and some time ago the railway company failed in a legal action to compel these 'bus proprietors to pay ½d. per passenger carried, it being held that the toll of 4d. per vehicle was the only legal charge.

**Efficiency of Life-Guards.**—It was stated at an inquest held at Bradford on a man who was killed while attempting to cross the road between two tramcars, that the last fatal accident to a passenger occurred on September 28, 1912. Since that date 67 people had been knocked down, 41 had fallen clear of the track, and 26 had been picked up safely by the life-guard. The Corporation had the most up-to-date invention in life-guards. Since 1898 a total of 550 million passengers had been carried, and there had only been two fatal accidents to passengers. In 1911 there was one fatal accident to a pedestrian, but none in 1912 or 1913.

**Lowestoft Chairman's Interesting Question.**—Councillor Spashett, chairman of the Tramways Committee, at a meeting of Lowestoft Council on November 13, asked the Town Clerk whether they could set aside some sum for depreciation, although they were not making a profit. They were setting nothing aside. The Town Clerk said it was a question that required consideration. Councillor Spashett: But I want to know, because I do not think we are in a position to set anything aside. Councillor A. B. Capps asked whether the fact of repaying capital did not allow for depreciation? The Town Clerk said that no doubt met depreciation to some extent, but it was not a sufficient amount to replace the wear and tear, and it was a matter that required a good deal of consideration. The question was one on which he did not like to give an unconsidered reply.

**Ilford and Inter-Running.**—Ilford Urban Council were recommended by the Tramways Committee to enter into a three years' agreement with East Ham Corporation for 5½d. instead of 6d. per car mile run on the Ilford Council's Ilford Hill section. Councillor Waters moved to refer the paragraph back "in order that negotiations may be entered into with neighbouring authorities to arrange a system of inter-running financially satisfactory to all parties." The recommendation was adopted, subject to the clerk so framing it that the three years' agreement should terminate whenever arrangements could be made for inter-running. The Ilford Council's tramways, which have through running with London, are now showing considerable increases in the receipts as compared with the same weeks last year, although the omnibus competition is as keen as ever.

**Edison Accumulators, Limited,** exhibited at the Motor Show at Olympia, on the stand of Messrs. Arrol-Johnston, a three-passenger Edison accumulator car, and they also had a number of similar vehicles outside for purposes of demonstration. The company's vehicles are attracting increasing attention, owing to the excellent results obtained from those in service. Among users are Messrs. Liberty, who have recently ordered two more vans. This firm has proved the advantages of the accumulator car. Messrs. Pullars have placed an order for a one-ton van for use in the London area. The Stratford Co-operative Society have also ordered a car, and it will be recalled that only recently the Ilford Borough Council placed an order for a tower wagon for use in their tramways and lighting department. The Edison Company are now established at their new offices, which include the whole of the building Nos. 2 and 3, Duke Street, and No. 1, King Street, St. James Street, W. The premises will be known as the Edison Building.

**Insurance Companies and Damage to Generating Stations.**—Mr. J. E. Teasdel, engineer and general manager of Pontypridd tramways, has reported to the Tramways Committee that the recent tornado caused considerable damage to the electrical works. He made a claim against the insurance company, and while he could not show any fire or scorching resulting from the effects of electrical disturbance, he had evidence which should go to prove that lightning played a very prominent part. The Clerk added that the company would not admit that the damage was caused by lightning, but contended that it was due to a wind storm. He understood that all the insurance companies, after considering the reports of the assessors, had decided to adopt that attitude.

**Progress at Newcastle.**—Alderman Rodgers has presented to the Corporation the appended comparative return of tramways traffic from April 1 to November 1:—

| | Receipts. | Passengers. | Miles. | Average per car mile. |
|---|---|---|---|---|
| 1913 .. .. | £150,909 14 1½ | .. 33,405,022 | .. 3,100,388 | .. 11.62 |
| 1912 .. .. | 135,708 3 6½ | .. 29,851,017 | .. 2,755,602 | .. 11.82 |
| 1911 .. .. | 132,679 18 2 | .. 28,842,065 | .. 2,688,386 | .. 11.84 |

A report of the Tramways Committee, recommending an increase of 1s. per week in the wages of motormen and conductors has been adopted.

## CONTRACTS AND ORDERS.

**E. Bennis and Co., Limited,** have received a repeat order from Barnsley Council for four mechanical stokers and self-cleaning compressed air furnaces.

**London County Council** have accepted the following tenders:—G. Hayward, 80 movable platforms for car-washers at Cressy Road car shed and 36 such platforms for use at Camberwell car shed extension, £7 each; Enfield Autocar Company, Birmingham, six motor cars for the tramway department, £1,986; Dennis Brothers, motor lorry for use by the fire brigade, £615.

**London and South Western Railway Electrical Scheme.**—Messrs. Scholey and Company Limited have received an order for their special tool steel gears and pinions from the British Westinghouse Company for the whole of the equipments required in the electrification of the suburban lines of the London and South Western Railway. This constitutes the largest single order ever placed in this country for gears and pinions.

**Tilling-Stevens Omnibuses for Johannesburg.**—An order has been given by the Johannesburg Council for four more Tilling-Stevens petrol-electric omnibuses. For the bodies local tenders have been invited in order that local experience may be utilised to secure a body suitable to the climate. The decision to purchase the vehicles was arrived at on the recommendation of the tramways manager after the experience of the running of a petrol-electric and another type of machine purchased in March last.

## PERSONAL.

**The Late Mr. T. Frame Thomson,** a director of several South American tramway companies, has left estate valued at £47,183 net.

**Mr. George Balfour,** of Messrs. Balfour, Beatty and Company, has been appointed a director of the United Electric Tramways of Monte Video.

**Mr. H. Broadbent,** chief electrical engineer to Perth Corporation, Western Australia, is now on a business visit to England. His address is 4, Queen Street Place, E.C.

**Mr. T. E. Boothby,** of the Oldham Corporation electricity department, has been appointed shift engineer at the works of the Stalybridge, Hyde, Mossley and Dukinfield Tramways and Electricity Board.

**Alderman J. Miles, J.P.,** chairman of Bolton Tramways Committee, was prevented by indisposition from presiding at the annual fancy dress ball of the tramways employees. The guests acted as judges.

**Alderman A. Martin,** chairman of Southend Light Railways Committee, presided at the first of the annual dinners of the employees, and, responding to the toast of his health, said more depended upon the staff who had the handling of the tramway undertaking than upon the members of the committee who controlled it.

**Mr. P. J. Boucher,** for three years traction lamp expert to Siemens Bros. Dynamo Works, Limited, has been appointed to a similar position with the Edison and Swan United Electric Light Company, London. Mr. W. H. Mulhall, who has acted in a like capacity for Siemens' for three years, has also joined the Ediswan staff.

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**Mr. Percy Hodges**, of the Blackpool Corporation electricity works, has received an appointment at Valparaiso. The staff have presented him with a gold watch, a travelling trunk, and a fountain pen.

**Mr. F. W. Ketley**, general manager, Norwich Electric Tramways Company, and joint treasurer with Mr. P. F. Robertson to a fund started in aid of the family of the late Mr. H. J. Meachen, a motorman of long service, has written to the local newspapers acknowledging the receipt of a sum of £73. Of that amount the company, officers, and employees contributed over £23.

**Mr. R. H. Harvey**, engineer and manager to the Ascuncion Tramways of the Paraguay Central Railway Company, was referred to at a recent meeting of the shareholders in London. The chairman (Mr. V. V. Branford) stated that the directors were fortunate in obtaining the services of a very able and experienced engineer and tramway manager, under whose organisation the electrification of the Ascuncion tramway had proceeded satisfactorily, and would be completed within a few weeks probably, and the installation of the light and power plant before the end of the year. A separate company, the Ascuncion Tramway, Light and Power Company, had been organised and would work in collaboration with the railway company.

## FINANCIAL REPORTS AND MEETINGS.

**The British Electrical Federation.**—The traffic statement for the week ended November 14, 1913, shows that the receipts from tramways and railways amounted to £38,431, as compared with £36,022 in the corresponding week last year, and from omnibuses £11,777, as compared with £1,578, making a total of £50,208, as compared with £37,600. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show an increase of £2,356 upon the week.

**Buenos Ayres Lacroze Tramways Company.**—The receipts for the year ended June 30 amounted to $6,162,305 legal currency, an increase of $511,477 on the previous year, and the working expenses were $3,830,729, an increase of $361,748, leaving $2,322,575 as net revenue, while $115,380 was received as interest, etc., and $24,917 was brought forward. After providing for debenture interest and other charges the divisible balance is $1,732,937. A dividend of 5 per cent. is proposed, adding $85,400 to the reserve, $250,000 to the renovation funds, and $23,134 to the fund for extraordinary expenses, and carrying forward $30,460.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended November 15 amounted to £226,129, or £18,433 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £79 0s. 2d. per track mile, an increase of £4 7s. 1d. per mile as compared with last year.

(*Continued from page* 460.)


## POSITIONS VACANT.

### DRAUGHTSMAN.

Wanted at once, an expert Draughtsman. Must be a thorough mechanical engineer, familiar with all truck mechanism, and able to design.

Address, stating experience and salary wanted, Anger Manufacturing and Supply Company, Bank Chambers, Preston, England.

### PERMANENT WAY FOREMAN.

Permanent Way Foreman wanted for a small Tramway System of 20 miles route. Applicants to state experience in plate laying, etc., and wage expected.

Box 473. Applicants for the post of Assistant Manager are thanked, and hereby notified that the vacancy is filled.

### BUYING AGENTS.

Experienced and responsible New York firm, now buying for important foreign interests and enjoying favourable relations with many manufacturers—especially in Railway Materials and Equipment—can handle other accounts to advantage. It is hoped that this announcement may favourably interest railways, firms, or individuals needing, in the United States, agents capable of giving better than the usual attention to purchases and shipments from that country. Unquestionable references will be furnished. All correspondence considered confidential.

Address, Broadway, c/o THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, W.C.


## COPPER AND ALUMINIUM MARKET.

November 21, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, November 21. | Last week. | A Year Ago |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 66 15 0 | 68 2 6 | 77 12 6 |
| ,, ,, (three months) .. .. | 65 12 6 | 67 12 6 | 78 7 6 |
| Electrolytic Copper—bars or ingots | 70 10 0 | 72 10 0 | 82 0 0 |
| Aluminium—bars or ingots .. .. | 83 0 0 | 83 0 0 | 83 10 0 |

## COAL MARKET.

November 21, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, November 21. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 | 25 3 | 23 3 | 22 0 |
| Best Seconds.. .. .. | 24 9 | 24 6 | 22 9 | 21 3 |
| Ordinary Drys .. .. | 22 0 | 21 9 | 21 6 | 20 3 |
| Best Washed Nuts .. .. | 21 0 | 21 0 | 20 6 | 19 6 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 19 0 | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 | 20 9 | 17 6 | 17 0 |
| Best Seconds .. .. | 20 3 | 20 0 | 17 0 | 16 3 |
| Ordinary Drys .. .. | 17 6 | 17 3 | 15 9 | 15 3 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 14 9 | 14 6 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 13 3 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams.. .. .. | 15 0 | 15 0 | 13 9 | 11 0 |
| Best Seconds .. .. | 13 0 | 13 0 | 13 3 | 10 6 |
| Smalls .. .. .. | 7 0 | 7 3 | 10 6 | 6 0 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Nov 18 | £53,473 | £51,517 | 46 | £2,516,810 | +£186 441 |
| Auckland..... (28 days) | Oct. 24 | 19.071 | 20,204 | 17 | 81,757 | + 3.728 |
| Ballarat and Bendigo | Sept. 28 | 1,095 | 883 | 26 | 22 632 | — 515 |
| Brazilian St. Rly. Mlrs | Sept. | 42,083 | 50,952 | 8 | 101,3 3 | + 18,853 |
| Brazilian Traction .... | Nov. 15 | 85,852 | 93,361 | ... | ... | ... |
| Brisbane ... | O tober | 23,017 | 27,250 | 43 | 260 018 | + 55.907 |
| British Columbia .. $ | Sept. | 688.09 | 734.283 | 13 | 2,260,854 | + 247.168 |
| Buenos Aires Pr. & City | July | 6,124 | 6,513 | 30 | 46 073 | + 1,760 |
| Buenos Aires Lacroze | October | 41,6 0 | 45,679 | 17 | 179 524 | + 7.826 |
| Calcutta.....Rs | Nov. 15 | 64 432 | 69,814 | 46 | 29,61,846 | + 1.44,283 |
| Cape Town ..... | 8 pt. | .. | 11,293 | | .. | .. |
| Carthagena & Herreria | October | 2.376 | 1,582 | 43 | 76 2 3 | + 4.601 |
| Cordoba..... ..... | Sept. | 11,745 | 13,356 | 26 | 80.725 | + 8,456 |
| East India ..... | Oc ober | 1,911 | 1,878 | 13 | 5,911 | + 147 |
| Kalgoorlie..... ..... | O tober | 2,955 | 2,652 | 43 | 29.099 | — 2.644 |
| La Plata..... | Oct ber | 5,008 | 4,920 | 43 | 50,431 | + 9.327 |
| Lima..... | Sept. | 25,660 | 34,110 | 39 | 300,647 | + 23.783 |
| Lisbon ..... Mlrs | Sept. | ... | 144,588 | ... | ... | .. |
| Madras (14 days) Rs. | Nov. 15 | 24,262 | 24,050 | 45 | 560,783 | + 37,103 |
| Melbourne ..... | October | .. | 65,000 | ... | ... | ... |
| Mexico ..... $ | October | 586,273 | 6 6,0.7 | 43 | 5.732,338 | + 137.633 |
| Montevideo..... ... | Sept. | 27 711 | 27,670 | 47 | 844,301 | + 26 483 |
| Para ..... | Nov. 16 | 3,847 | 3,798 | 50 | 198.800 | — 1,709 |
| Port Elizabeth..... ... | Sept. | .. | 3,071 | ... | ... | ... |
| Shanghai .....$ | Nov. 12 | 19,810 | 24,400 | 45 | 1,061,999 | + 117.796 |
| Singapore ..... $ | Nov. 15 | 10.546 | 13,092 | 46 | 551,481 | + 72,713 |
| Toronto ..... $ | Sept. | 787,844 | 865.7.6 | 39 | 7,188,470 | + 962 426 |
| Winnipeg..... ..... $ | Sept. | 309,722 | 331,752 | 39 | 2,181 434 | + 243,382 |


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# TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended. | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Nov. 12 | £1,511 | £1,618 | + £77 | 24 | £40,224 | + £2,560 |
| Accrington Corp. | ,, 12 | 521 | 563 | + 42 | 32 | 18,718 | + 1,770 |
| Ayr Corporation | ,, 15 | 199 | 244 | + 45 | 26 | 11,756 | + 1,611 |
| Bath Electric | ,, 12 | 657 | 775 | + 88 | 46 | 44,756 | + 3,599 |
| Birkenhead Corp. | ,, 16 | 1,089 | 1,232 | + 143 | 33 | 42,910 | + 4,235 |
| Birmingham Corp. | ,, 15 | 10,967 | 12,665 | + 1,698 | 33 | 386,552 | + 34,854 |
| Blackburn Corporation | ,, 12 | 1,204 | 1,230 | + 26 | 33 | 44,320 | + 4,211 |
| Blackpool & Fleetwood | Oct. 25 | 921 | 467 | + 146 | 17 | 27,482 | + 4,607 |
| Blackpool Corporation | Nov. 13 | 448 | 534 | + 66 | 32 | 73,019 | + 11,750 |
| Bolton Corporation | ,, 16 | 2,530 | 2,738 | + 208 | 33 | 90,934 | + 5,342 |
| Bournemouth Corp. | ,, 19 | 1,468 | 1,644 | + 176 | 33 | 74,013 | + 8,798 |
| Bradford Corporation... | ,, 15 | 5,216 | 5,569 | + 353 | 33 | 197,537 | + 12,370 |
| Brighton Corporation... | ,, 16 | 768 | 903 | + 135 | 33 | 38,849 | + 2,745 |
| Bristol | ,, 14 | 6,508 | 7,537 | + 1,028 | 45 | 367,865 | + 50,207 |
| British Elec. Federatn. | ,, 14 | 37,600 | 50,208 | * | ... | ... | ... |
| Burnley Corporation .. | ,, 15 | 1,445 | 1,654 | + 209 | 31 | 56,950 | + 6,797 |
| Burton-on-Trent Corp. | ,, 16 | 252 | 297 | + 45 | 33 | 9,704 | + 491 |
| Bury Corporation | ,, 16 | 1,211 | 1,260 | + 49 | 33 | 45,247 | + 1,837 |
| Cardiff Corporation | ,, 8 | 2,407 | 2,673 | + 266 | 32 | 83,489 | + 9,571 |
| Chatham and District.. | ,, 13 | 792 | 872 | + 80 | 45 | 42,261 | + 2,747 |
| Chesterfield Corp. | Oct. 23 | 235 | 256 | + 21 | 29 | 7,716 | + 955 |
| Colne & Trawden | Nov. 15 | 247 | 254 | + 17 | 46 | 12,632 | + 779 |
| Cork Electric | ,, 13 | 427 | 483 | + 56 | 45 | 22,824 | + 641 |
| Croydon Corporation .. | ,, 7 | 1,698 | 1,626 | — 72 | 31 | 53,207 | — 5,380 |
| Darlington Corporation | ,, 8 | 222 | 243 | + 21 | 32 | 8 030 | + 800 |
| Derby Corporation | ,, 15 | 901 | 1,051 | + 147 | 33 | 32,911 | + 3,486 |
| Dover Corporation | ,, 15 | 187 | 207 | + 20 | 33 | 8,715 | + 203 |
| Dublin & Lucan | ,, 14 | 111 | 106 | — 5 | 19½ | 3,012 | — 31 |
| Dublin United | ,, 14 | 5 106 | 4,785 | — 320 | 45 | 250,789 | — 14,374 |
| Dundee City | ,, 12 | 1,171 | 1,257 | + 86 | 26 | 34,563 | + 2,650 |
| East Ham Corporation | ,, 15 | 1,052 | 1,018 | — 34 | 32 | 33,889 | — 1,459 |
| Exeter Corporation | ,, 14 | 277 | 311 | + 34 | 33 | 11,752 | + 615 |
| Gearless Motor 'Buses. | ,, 15 | ... | 475 | ... | 32 | 16,026 | ... |
| Glasgow Corporation .. | ,, 15 | 18 756 | 20,648 | + 1,892 | 24 | 486,848 | + 36,378 |
| Glossop(U.Elec.Supply) | ,, 13 | 119 | 123 | + 4 | 46 | 5,976 | + 546 |
| Halifax Corporation ... | ,, 11 | 1,821 | 1,879 | + 59 | 32 | 69.994 | + 2,395 |
| Hastings & District..... | ,, 13 | 727 | 807 | + 81 | 32 | 48.627 | + 3,538 |
| Huddersfield Corp. | ,, 15 | 1,983 | 2,071 | + 208 | 33 | 70,954 | + 4,584 |
| Hull Corporation | ,, 15 | 3,051 | 3,243 | + 192 | 33 | 103,652 | + 5,734 |
| Ilford U.D.C. | ,, 15 | 389 | 447 | + 58 | 33 | 15,035 | — 1,124 |
| Ilkeston Corporation .. | ,, 19 | 114 | 133 | + 19 | 34 | 4,569 | + 732 |
| Ipswich Corporation .. | ,, 15 | 374 | 415 | + 41 | 33 | 15,923 | + 684 |
| Isle of Thanet | ,, 15 | 276 | 343 | + 67 | 7 | 2,869 | + 325 |
| Kilmarnock Corp. | ,, 15 | 152 | 165 | + 13 | 26 | 4.714 | + 328 |
| Lanarkshire | ,, 13 | 1 453 | 1,786 | + 333 | 45 | 77,583 | + 9,958 |
| Lancashire United | ,, 12 | 1,295 | 1,551 | + 256 | 45 | 70 501 | + 8,367 |
| Leeds City | ,, 15 | 7,474 | 7,969 | + 495 | 33 | 274,766 | + 17,677 |
| Leicester Corporation.. | ,, 15 | 2,576 | 2,866 | + 290 | 46 | 128,948 | + 12,023 |
| Leith Corporation | ,, 15 | 600 | 659 | + 59 | 26 | 19.213 | + 941 |
| Leyton U.D.C. | ,, 6 | 1,184 | 1,238 | + 54 | 31½ | 43,058 | — 567 |
| Liverpool Corporation.. | ,, 15 | 11,643 | 12,966 | + 1,273 | 46 | 591,296 | + 44,895 |
| Llandudno &Colwyn B. | ,, 14 | 143 | 152 | + 9 | 50 | 17,363 | + 1,465 |
| London County Council | ,, 12 | 41.223 | 43.523 | + 2.301 | 32 | 1,363,870 | — 1,186 |
| London Gnl. Omnibus.. | ,, 15 | 55,366 | 57,366 | + 2,000 | 46 | 2,853,580 | + 430,682 |
| London United | ,, 14 | 5.415 | 5,835 | + 420 | 48 | 290.386 | + 5 825 |
| Lowestoft Corporation | ,, 15 | 193 | 197 | + 4 | 6 | 1,327 | + 103 |
| Maidstone Corporation | ,, 13 | 157 | 184 | + 27 | 33 | 6,974 | + 468 |
| Manchester Corp. | ,, 15 | 15.971 | 17,416 | + 1,445 | 33 | 582,619 | + 29.738 |
| Met. Elec. Trys. | ,, 14 | 8.432 | 9,088 | + 586 | 46 | 416,182 | + 14,464 |
| Nelson Corporation | ,, 8 | 191 | 178 | — 13 | 32 | 6.839 | + 388 |
| N'castle-on-Tyne Corp. | ,, 15 | 4,508 | 5,015 | + 507 | 33 | 160,938 | + 15,125 |
| Newport (Mon.) Corp. | ,, 15 | 693 | 776 | + 83 | 33 | 25,525 | + 2,038 |
| New St. Helens & Dist... | ,, 12 | 685 | 747 | + 62 | 20 | 17,104 | + 1,865 |
| Northampton Corp | ,, 14 | 522 | 541 | + 19 | 33 | 19.318 | + 1,307 |
| Nottingham Corp. | ,, 13 | 3,152 | 3,335 | + 183 | 32½ | 110,160 | + 5,134 |
| Oldham Corporation ... | ,, 16 | 1,897 | 2,158 | + 261 | 34 | 75,547 | + 4.969 |
| Portsmouth Corp. | ,, 15 | 1,675 | 1,996 | + 321 | 33 | 78,964 | + 5 218 |
| Preston Corporation ... | ,, 5 | 802 | 856 | + 54 | 32 | 28 653 | + 1,823 |
| Provincial | ,, 15 | 1,529 | 1,689 | + 160 | 7 | 11,741 | + 784 |
| Reading Corporation .. | ,, 13 | 599 | 742 | + 143 | 32 | 23 063 | + 1,841 |
| Rochdale Corporation | ,, 16 | 1,393 | 1,545 | + 152 | 33 | 53,816 | + 2 319 |
| Rotherham Corp. | ,, 19 | 902 | 1,017 | + 115 | 33 | 34,587 | + 7,803 |
| Salford Corporation .. | ,, 17 | 4.761 | 5,084 | + 323 | 33 | 173 729 | + 7 247 |
| Sheffield Corporation... | ,, 16 | 6,946 | 7,524 | + 577 | 34 | 247.653 | + 21.013 |
| Southampton Corp. .... | ,, 12 | 1,093 | 1,242 | + 149 | 32 | 44 242 | + 2.767 |
| Southend-on-Sea Corp | ,, 12 | 552 | 702 | + 150 | 34 | 33,879 | + 5,854 |
| South Met. Trys. | ,, 14 | 733 | 992 | + 259 | 46 | 42.733 | + 3,918 |
| South Shields Corp. | ,, 15 | 604 | 662 | + 58 | 33 | 24,090 | + 2.981 |
| Sunderland Corp. | ,, 16 | 1.223 | 1,317 | + 94 | 33 | 48,438 | + 4,983 |
| Sunderland District .. | ,, 12 | 479 | 518 | + 39 | 2 | 1.078 | + 115 |
| Swindon Corporation .. | ,, 12 | 147 | 158 | + 11 | 32 | 5,500 | + 369 |
| Trys. (M.E.T.) 'Buses | ,, 15 | ... | 8,167 | ... | 42 | 223,488 | .. |
| TynesideTrys.&Tmrds | ,, 12 | 446 | 453 | + 12 | 20 | 10,594 | + 709 |
| Wallasey Corporation | ,, 15 | 962 | 1,100 | + 138 | 33 | 41 416 | + 3 949 |
| Walsall Corporation .. | ,, 15 | 577 | 656 | + 79 | 46 | 28,666 | + 2,032 |
| Walthamstow U.D.C.... | ,, 15 | 594 | 712 | + 118 | 33 | 25,012 | + 677 |
| Warrington Corp ..... | ,, 13 | 429 | 451 | + 22 | 33 | 14,560 | + 492 |
| West Ham Corporation | ,, 13 | 2,487 | 2 738 | + 251 | 32 | 89.215 | + 3,423 |
| Wigan Corporation .... | ,, 13 | 1,361 | 1,551 | + 190 | 32½ | 48,586 | + 4,892 |
| Wolverhampton Corp | ,, 19 | 965 | 1.029 | + 64 | 34 | 36,582 | + 2.107 |
| Yorkshire (W. Riding) | ,, 16 | 1,518 | 1,442 | — 76 | 46 | 66,824 | + 6,933 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,356 upon the week.

# ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Nov. 15 | £5,578 | £5,546 | — £32 | 46 | £223.006 | + £6,311 |
| City and South London | ,, 15 | 2 999 | 2,880 | — 119 | 46 | 127 927 | — 12,189 |
| Liverpool Overhead..... | ,, 16 | 1,583 | 1,703 | + 114 | 46 | 78.879 | + 5,925 |
| London Electric..... | ,, 15 | 14,860 | 15.170 | + 310 | 46 | 624.925 | + 1,140 |
| Mersey ..... | ,, 15 | 2.170 | 2,128 | — 42 | 46 | 102.785 | + 4,814 |
| Metropolitan ..... | ,, 16 | 16,663 | 18.380 | + 1 717 | 46 | 791,597 | + 25,574 |
| Metropolitan District.. | ,, 15 | 13,919 | 14.230 | — 311 | 46 | 596,222 | + 17,734 |

# TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations. November 21. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | — 1 | 69 — 74 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | — ⅛ | 4⅞ — 4⅞ |
| 5 | Do. 5½% Cum. 2nd Pref. | ... | 4⅛ — 4⅜ |
| 100 | Do. 4% Deb. Stk. Red. | ... | 89½ — 91½ |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 97½ — 99½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 98½ —100½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 101 —103 |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — ⅞ |
| 1 | Do. 5% Cum. Pref | ... | 25/32 — 25/32 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 88 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| 10 | Bombay Elec. Supply and Trams. Co., 6% Cum. Pref. | + 1 | 11¾ — 12½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | ... | 88 — 88 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅜ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 6½ — 7 |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Ely. Co., Lim., Def. Ord. Stck. | — 1 | 114 —119 |
| 100 | Do. Pref. Ord. Stock | ... | 102 —107 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock. | + ⅛ | 99½ —102½ |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 97 —100 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. | + 1 | 92 — 95 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | ... | 87 — 90 |
| 10 | Do. 7% Non-Cum. Pref. | ... | 48 — 51 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | — ⅛ | 10⅝ — 12⅛ |
| 100 | Do. Deferred Ord. Stock | — ⅛ | 5⅛ — 5⅛ |
| 10 | Do. 5% Perpetual Debenture Stock. | + 1 | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | + 2 | 77 — 80 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 000 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 98½ —100½ |
| 5 | Calcutta Tramways Co., Limited, Ord. | ... | 5⅜ — 6⅜ |
| 5 | Do do. 5% Cum. Pref. | ... | 4⅛ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., ..... | ... | ⅞ — ⅞ xd |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 190 | Do. 5% Debs. Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5½ — 5⅝ xd |
| 100 | Do. 4% Debenture Stock Red, 1985 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 88 — 92 |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 91½ — 93½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅝ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | ... | — 10¾ |
| 10 | Do. do. 6% Pref. | ... | — 12 |
| 100 | Do. do. "A" Red. | — 3½ | — 73½ |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 79 xd |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 9 — 9½ |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | ⅝ — ¾ |
| 1 | Do. do. 6% Cum Pref. | ... | ½ — ¾ |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 8% Mort. Bds. (Regd.) | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. | ... | 3½ — 4¼ |
| 10 | Do do. 6% Cum. Pref. | ... | 6½ — 6¾ |
| 100 | Do. do. 4½% Deb. Stock | ... | 76½ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2⅛ — 2⅜ |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — 1/16 |
| 100 | Do do. 5% "A" Deb. Stk. | ... | 85 — 90 |
| 10 | Do. do. 6% "B" do. | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | ⅞ — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¾ — 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1 — 1¼ xd |
| 1 | Do. 6% Cum Pref. | ... | 1⅛ — 1⅛ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | + ⅛ | ⅛ — 5/16 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 95 — 97 |
| 100 | Do. Do 5% Cum. Inc. Deb. Stk. Red. | ... | 85 — 87 |
| 100 | London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red | + 1 | 53 — 62 |
| 100 | Madras Electric Trams. (1904), Lim., 5% Deb. Stk., Red. | ... | 101 —103 |
| 5 | Do, do. 6% Cum. Pref. | ... | 4¼ — 5⅛ |
| 10 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 85 — 87 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | + 1 | 108 —111 |
| $1,000 | Do. do. 5% Bds. | ... | 93¼ — 98½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 29/32 — 1⅛ |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 83 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| $100 | Mexico Tramways Co., Common Stock | — 1 | 77 — 81 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | + 2½ | 80 — 85 |
| 100 | Do. 6% 50-yr. Mort. Bonds | + 2½ | 83 — 85 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | — 1 | 89½ — 91½ |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1923) | + 1 | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | + 1 | 98 —100 |
| 1 | National Steam Car Co. Ltd | — 1/16 | 1⅛ — 1¼ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 5⅞ — 6⅛ |
| 10 | Do. do. 5% Cum Pref. | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 5⅝ — 6⅛ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 15/16 — 1 |
| 1 | Do. 5% Cum Pref | ... | 15/16 — 1 |
| 100 | Do. 4½% Debenture Stock, Red. | ... | 80 — 83 xd |
| 1 | Provincial Tramways, Lim., Ord. | ... | 29/32 — 31/32 |
| 1 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 82 — 85 |
| 5 | Rangoon Elec. Trams. & Supply Co. 6% Cum. Pref. | ... | 5⅛ — 5⅝ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 97 — 99 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | + 1½ | 84 — 87 |
| $100 | Rio de Janeiro Tramway Light and Power Co. | ... | — |
| $500 | 1st Mt. 30-yr 5% Gold Bonds | ... | 93 —101 |
| 100 | 5% 50-yr. Mort Gold Bonds | ... | 83 — 90 |
| 10 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | + 1 | 99 —102 |
| $500 | Do 5% 1st Mort. Debs., Red., 1929 | ... | 99 —102 |
| 10 | Shanghai Elec. Construction Co. | ... | 10½ — 11½ |
| 10 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 83 — 90 |
| ... | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | ⅝ — ¾ |
| 10 | Do. do. 4% Deb. Stk. | ... | 68 — 72 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 85½ — 87½ |
| 10 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4⅞ — 5⅛ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | + 2 | 94½ — 97½ |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. | ... | 1/16 — 1/8 |
| 5 | Do. do. 6% Cum Pref. | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. | ... | 81 — 86 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 27. | LONDON, SATURDAY, NOVEMBER 29, 1913. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone; No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### CITY OF BRADFORD.

The Bradford Corporation invite tenders for the supply and erection of the following :—

Contract "R. 28."—One Turbo-Generator of a capacity of about 5,000 kilowatts;
Contract "R. 29."—Storage Batteries, Boosters, and Switch and Regulating Gear;
Contract "R. 30."—Two 1,500 Kilowatt Rotary Converters, Transformers, and Switchgear.

Copies of the specifications, general conditions of contract, and forms of tender may be obtained from Mr. Thomas Roles, City Electrical Engineer and Manager, Electricity Offices, Town Hall, Bradford, on payment of the sum of one guinea for the specification, etc., for each contract. Additional copies of the specifications may be obtained on payment of the sum of half-a-guinea per copy. The sums paid will only be returned upon receipt of a *bonâ-fide* tender, with the return of all the documents in good condition, and after the tenders have been adjudicated upon.

Sealed tenders, on the forms provided, must be sent, fully filled in, to me not later than 10 a.m. on Friday, December 19, 1913, endorsed, "Tender for Electricity Works—Contract 'R. 28,' 'R. 29,' or 'R. 30,'" as the case may be.

The contracts will be let subject to the Fair Contracts Clauses of the Corporation.

The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
November 25, 1913.

### COUNTY BOROUGH OF SOUTH SHIELDS.

CORPORATION ELECTRIC SUPPLY DEPARTMENT.

CONTRACTS NOS. 88 AND 89.

The Corporation invite tenders for the supply, delivery, and erection of :—

Two Water-tube Boilers Complete with Mountings and Fittings, etc., as per Specification, and
One Economiser, as per Specification.

Single copies of the specification, general conditions, form of tender, and form of contract can be obtained on and after Saturday, the 29th instant, from Mr. Harry S. Ellis, Borough Electrical Engineer, South Shields, on payment of one guinea, which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of ten shillings per copy, which will not be refunded. Tenders on the form supplied, sealed and endorsed, "Tender for Water-Tube Boiler, etc." or "Tender for Economiser," as the case may be, must be delivered to me at my office, Municipal Buildings, South Shields, on or before noon of the 13th December, 1913. The Corporation do not bind themselves to accept the lowest or any tender, and any acceptance will be subject to the sanction of the Local Government Board being obtained for the carrying out of the work.

J. MOORE HAYTON,
November 24, 1913. Town Clerk.

### SOUTH INDIAN RAILWAY COMPANY, LTD.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of :—

No. 1.—Cast Iron Sleepers, about 3,329 tons, for 50 lb. Rails.
No. 2.—Steel Rails (50 lb. per yard Bull Head), about 2,087 tons.
And Fish-Plates for above Rails (about 395 tons).
No. 3.—Steel Rails (80 lb. per yard Bull Head), about 1,571 tons.
And Fish-plates for above Rails (about 69 tons).
And Fish-Plates for 75 lb. Double-head Rails (about 7 tons).
No. 4.—Brushes.
No. 5.—Oils and Colours.
No. 6.—Lamps and Glass.

Specifications and forms of tender may be obtained at the Company's Offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Cast Iron Sleepers," or as the case may be, must be left with the undersigned not later than 1 o'clock on Wednesday, December 10, 1913.

The Company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of £2 each for specifications Nos. 1, 2, and 3, and 10s. each for Nos. 4, 5, and 6.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.

By order, V. E. DE BROE, M.Inst.C.E.,
for Managing Director.

Company's Offices,
91, York Street, Westminster, S.W.,
November 25, 1913.

### MADRAS AND SOUTHERN MAHRATTA RAILWAY CO., LTD.

The Directors are prepared to receive tenders for :—

(1) Steel Material (Angles, Flats, Rounds, etc.),
(2) Cast Iron Sleeper Pots and Fittings,
(3) Steel Rails,
(4) Steel Fish-Plates,
(5) Cast Iron Chairs,

in accordance with the specifications, which may be seen at the offices of the Company. The charge for specifications Nos. 1, 2, 3, and 4 is one guinea each, and for No. 5 half-a-guinea each, which will not be returned.

Tenders must be sent in addressed to the Secretary, not later than 2 p.m., on Tuesday, December 9, 1913, marked "Tender for Steel Material," or as the case may be.

The Directors do not bind themselves to accept the lowest or any tender.

H. BONHAM-CARTER,
Company's Offices, Secretary.
91, York Street, Westminster, S.W.,
November 25, 1913.

### COUNTY BOROUGH OF BRIGHTON.

TRAMWAYS DEPARTMENT.

The Council hereby invite tenders for the supply and delivery of 240 tons of British Standard No. 4 Rails.

The specification and form of tender may be obtained on application at my office, at the Town Hall, Brighton.

Sealed tenders, addressed to me, and endorsed "Tenders for Rails," must be left at my office before 10 o'clock in the forenoon on Monday, December 8, 1913.

The Council do not bind themselves to accept the lowest or any tender.

HUGO TALBOT,
Town Clerk.

Town Hall, Brighton,
November 22, 1913.

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## LEYTON URBAN DISTRICT COUNCIL.

TRAMWAYS DEPARTMENT.

TICKETS AND TICKET REGISTERING PUNCHES.

The Leyton Urban District Council hereby invite tenders for the supply to the Tramways Department of Passenger Fare Tickets, with or without advertising rights; and Ticket Registering Punches (on hire) from April 1, 1914.

Form of tender and further particulars may be obtained upon application at the office of the Tramways Manager, 590, Lea Bridge Road, Leyton, E., on and after Tuesday, December 2, 1913.

Tenders, enclosed in special endorsed envelopes supplied with the forms, must be delivered at the meeting of the Tramways Committee of the Council, to be held at the Town Hall, Leyton, on Thursday, December 11, 1913, at 7 o'clock.

The Council do not bind themselves to accept the lowest or any tender.

R. VINCENT,
Clerk to the Council.

Town Hall, Leyton,
November 27, 1913.

## SHEFFIELD CORPORATION TRAMWAYS.

ADVERTISING ON TRAMCARS.

The Tramways Committee invite tenders for rights of Advertising on the Tramway Cars of the Corporation—total number of cars about 360.

Particulars and forms of tender, together with "Conditions of Contract" as to under-letting, fair wages, hours of labour, and conditions of employment, may be obtained on application to Mr. A. R. Fearnley, General Manager, Tramways Department, Division Street, Sheffield.

Tenders, sealed and endorsed "Tender for Advertising," to be delivered to the General Manager, Corporation Tramways, Division Street, Sheffield, not later than 11 a.m. on Thursday, the 18th day of December, 1913.

No tender will be considered which is not submitted on the tender form supplied.

The Corporation do not bind themselves to accept the highest or any tender.

Any person or firm sending in a tender will be required to comply with the Council's form of clauses respecting wages, hours, and conditions of labour, and prohibition against assigning or under-letting, as set forth in the "Conditions of Contract," a copy of which may be obtained at my office upon application.

Dated this 27th day of November, 1913.

By order, WILLIAM E. HART,
Town Clerk.

Town Hall, Sheffield.

*(Continued on page 473.)*

**TRAMWAY SUPPLIES, Ltd.,**
**Tramway Engineers,**
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
**160, WOODHOUSE LANE, LEEDS.**
Sole Manufacturers of
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PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
**JARRAH**
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON." Telephone: 368. LONDON WALL.

**SIMPLEX CONDUITS, Ltd.**
**GARRISON LANE, BIRMINGHAM.**
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
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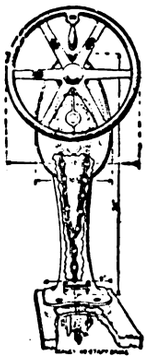

**THE BRITISH ACKLEY BRAKE AND SUPPLY CO., Ltd.,**
The British ABC TRADE MARK London.
WESTINGHOUSE BUILDINGS, NORFOLK STREET, LONDON, W.C.
Sole Licensors for the Manufacture of the Ackley "Adjustable" and "No Staff" Brakes in the United Kingdom, Norway, Sweden, Denmark, Belgium, Holland, and certain other territories.
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Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
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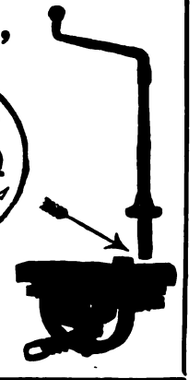

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THE
# Tramway AND Railway World

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*AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.*

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**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, NOVEMBER 29, 1913.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS.

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

## TRACTION LEGISLATION FOR NEXT SESSION.

In our last and our present issues appear summaries of the Parliamentary notices of all the private Bills to be promoted in next session of Parliament relating to tramways, electric railways, railless traction and omnibuses. The programme of business for private Bill Committees which is thus marked out does not promise to be a particularly heavy one. The total number of applications of the kind is thirty, as compared with thirty-six a year ago, while for two or three years preceding the numbers did not greatly vary. In the matter of tramways there are only two schemes of considerable magnitude, namely, those of Birmingham and Glasgow Corporations, each of which seeks authority to construct about twenty miles of new lines. These are cases in which large city systems are being pushed further out into the surrounding country. The case of Glasgow in particular is striking, because some of the proposed lines will, if constructed, link up the city and its suburbs with towns at some distance away which are separated from the city by open country. Another feature is the proposal by Bristol Corporation to take powers to acquire the tramway undertaking of the Bristol Tramways and Carriage Company. Bristol is one of the few great cities of the country which does not at present work its tramway system, but at all events it has been excellently served by the company, and if the purchase does take place it will be by agreement and not under the servile conditions of the Tramways Act. The London County Council tramway proposals are this year very small by comparison, but on the other hand there is some prospect that the consents of the road authorities will be obtained, so that the fiasco of some recent years may be avoided. The very wide powers asked by the London United Tramways Company in regard to leasing and working point to efforts being made for mutual arrangements between different companies and schemes for interchange of traffic, which ought to be of much advantage. The bulk of the other tramway proposals are simply for small or moderate extensions by local authorities of their existing systems. An effort is being made by the City of Oxford Electric Tramways Company to come to a statutory arrangement with the Corporation as to abolishing the existing horse tramways and running motor omnibuses instead. The only scheme of importance in connection with London underground electric railways is a Bill promised by the Metropolitan and Great Northern Railway Companies, which seeks to constitute a joint committee to construct the authorised extension of the Great Northern and City line to the Bank of England, and also lines, if they are authorised, forming a junction between the Great Northern and City line at Moorgate Street and the Inner Circle Railway near Aldgate, together with a further extension of the Great Northern and City from the Bank to a junction with the Waterloo and City Railway terminus. It is also sought to make a connecting line from the Great Northern and City Railway to the Great Northern line at Finsbury Park. The idea is to revert to the former scheme under which the Great Northern suburban trains will be able to run over the Great Northern and City line right into the heart of the City of London. This is a revival and improvement of a previous scheme. Probably the most remarkable feature of the Bills is the fact that no fewer than eighteen out of the total seek powers to run motor omnibuses. Practically all these Bills are promoted by local authorities, and in some cases by councils in whose districts there are no tramway systems. The number of proposals to erect poles and wires and to use them for working vehicles on the trackless trolley system is eight, two of which are promoted by companies and the rest by local authorities. A peculiarity about a Bill promoted by the North Eastern Railway Company is that they seek power to work trackless trolley vehicles from Newcastle to Gateshead along the roadway on their high-level bridge. This proposal is the outcome of a failure on the part of the railway company to obtain what they considered sufficient tolls from the owners of horse omnibuses which at present convey passengers across the bridge. Taken over all, the coming session so far as traction legislation is concerned ought to be a fairly interesting one.

## TRAMWAY CHAIRMEN FOR 1913-14.

The reorganisation of the Town Councils after the annual November elections has now been practically completed. In the great majority of cases the chairmen of the various Tramway Committees have been re-appointed for the ensuing year, as will be seen from the following list, which is continued from our issues of the 15th and 22nd inst.

| TOWN. | CHAIRMAN. | VICE-CHAIRMAN. |
|---|---|---|
| Aberdeen .. .. | Councillor J. A. Smith .. | — — — |
| Blackburn .. | Alderman W. Thompson .. | *Alderman Nuttall. |
| Coventry .. .. | Councillor Pridmore .. .. | *Councillor Tugh. |
| Darlington .. | Councillor T. E. Bates .. | — — — |
| Dartford .. .. | Councillor S. K. Keyes.. .. | *Councillor R. Bennett. |
| Dover .. .. | *Councillor E. E. Chitty .. | *Councillor Barwick. |
| Eccles .. .. | Alderman Nuttall .. .. | *Councillor A. Crummack. |
| Leicester .. .. | Alderman S. Flint .. .. | Alderman G. Banton. |
| Plymouth .. .. | Alderman S. H. Phillips (Deputy Mayor) .. .. | — — — |
| Salford .. .. | Alderman H. Linsley .. .. | *Councillor Barrett. |
| Sheffield .. .. | Alderman Sir W. Clegg .. | Councillor A. T. Bescoby |
| Swindon .. .. | *Councillor J. J. Shawyer .. | *Councillor T. C. Newman. |
| West Bromwich .. | Alderman Turley .. .. | — — — |
| Wolverhampton .. | Alderman Sir C. T. Mander .. | Alderman S. Craddock. |

* Denotes a change in the chairmanship or vice-chairmanship.

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## ELECTRIC TRACTION AND OMNIBUS BILLS FOR 1914.

In addition to the summaries of Parliamentary notices of private Bills for next session relating to tramways, electric railways, railless traction, and omnibuses which we published last week, the following are abstracts of further notices which have since appeared.

ABERDEEN CORPORATION.—To enable the Corporation, among other things, to construct about two miles of additional tramways, to run trackless trolley vehicles on two specified routes, to work motor omnibuses on any route within the city and on three specified routes outside the city, and to apply the free surplus revenue of the tramway undertaking to the Common Good of the city, or towards the reduction of the rates, or in carrying out city improvements. Solicitor—Wm. Gordon, L.L.D., town clerk, Aberdeen. Parliamentary agents—Martin and Co., 27, Abingdon Street, Westminster.

BIRMINGHAM CORPORATION.—To enable the Corporation, *inter alia*, to construct 17 additional tramway lines of a total length of about 20 miles, to run motor omnibuses in the city, and to widen streets. Solicitor—E. V. Hiley, town clerk, Birmingham. Parliamentary agents—Sharpe, Pritchard and Co., 9, Bridge Street, Westminster.

BOLTON CORPORATION.—To empower the Corporation among other things to construct about 2¼ miles of additional tramways, to run trailer cars and also special cars for special purposes, to carry by trucks on the tramways refuse, road materials, coal, and any other articles required for use by the Corporation, to work motor omnibuses in the borough, and to widen streets. Solicitor—Samuel Parker, town clerk, Bolton. Parliamentary agents—Dyson and Co., Caxton House, Westminster.

BOURNEMOUTH DISTRICT RAILLESS TRACTION.—To incorporate a company and to authorise it to work trackless trolley vehicles on two routes in Bournemouth, to acquire land for a generating station, to run omnibuses, and to enable the company to sell and Bournemouth Corporation to buy the undertaking of the company. Solicitors—Mooring, Aldridge and Haydon, Westover Chambers, Bournemouth. Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

CHESTERFIELD CORPORATION.—*Inter alia* to enable the Corporation to construct two additional tramways and to widen streets. Solicitor—JNO. Middleton, town clerk, Chesterfield. Parliamentary agents—Stevens, Son, and Parkes, 22, Bedford Row, London, W.C.

LEEDS CORPORATION.—Among other things to enable the Corporation to widen streets, to construct eight additional tramway lines within and outside the city, to work trackless trolley vehicles on four additional routes within and outside the city, to run motor omnibuses within the city, and to acquire lands. Solicitor—R. E. Fox, town clerk, Leeds. Parliamentary agents—Sharpe, Pritchard and Co., 9, Bridge Street, Westminster.

MANCHESTER CORPORATION.—To authorise the Corporation, *inter alia*, to widen streets, to extend the time for the completion of authorised tramways, to run omnibuses inside and outside the city, and to acquire lands for the erection of an electric generating station at Davyhulme. Solicitor—Thomas Hudson, town clerk, Manchester. Parliamentary agents—Sharpe, Pritchard and Co., 9, Bridge Street, Westminster.

NEWCASTLE-UPON-TYNE CORPORATION.—To enable the Corporation to construct about 4½ miles of new tramways (single line) in the urban districts of Longbenton and Weetslade, to provide for an appeal to the Board of Trade against a refusal by a local authority of consent to the construction of the tramways and an appeal to a petty sessional court against a refusal by an owner, lessee, or occupier of consent to any attachment to a house or building, to authorise the use of trailer cars and the running of motor omnibuses through Longbenton, to authorise the Corporation to run special cars or services of cars on special occasions and to charge higher fares on such cars. Solicitor—A. M. Oliver, town clerk, Newcastle-upon-Tyne. Parliamentary agents—Dyson and Co., Caxton House, Westminster.

NORTH EASTERN RAILWAY.—Among other things to authorise the company to work trackless trolley vehicles from Newcastle to Gateshead along the roadway on the company's high-level bridge. Solicitor—R. F. Dunnell, York. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

NORTH AND SOUTH SHIELDS RAILWAY.—To incorporate a company and to authorise it to construct an underground electric railway from North Shields, passing under the River Tyne; to acquire lands in South Shields and to erect an electric generating station thereon. (This is a revival of a scheme which was authorised by an Act passed in 1902, but which was never carried out.) Solicitors and Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

NORWICH ELECTRIC TRAMWAYS.—To authorise the company to construct six new tramways, and two doublings and two deviations, of existing lines, to widen streets and acquire lands, to abandon and take up certain existing tramways, to run motor omnibuses, vans, etc., and to raise further capital. Solicitors—Mills and Reeve, 69, London Street, Norwich. Parliamentary agent—John Kennedy, W.S., 25, Abingdon Street, Westminster.

OXFORD AND DISTRICT TRAMWAYS.—To enable Oxford Corporation and the City of Oxford Electric Tramways, Limited (the promoters), to enter into agreements for the sale to the Corporation of the existing tramways and their removal by the Corporation, the provision and working by the company of motor omnibuses, to provide that any agreement may include provisions for the payment by the company to the Corporation of any annual sum and for the company having the exclusive right of working motor omnibuses in the city, and to extend the time for the completion of authorised tramways. Solicitors and Parliamentary agents—Lees and Co., Palace Chambers, Bridge Street, Westminster.

POOLE, SANDBANKS AND WESTBOURNE RAILLESS TRACTION.—To enable the Sandbanks Railless Electric Car Company, Limited, to run trackless trolley vehicles on four routes in Poole, to erect the necessary poles, wires, etc., and to acquire lands and erect a generating station. Solicitors—Dickinson, Gwatkin and Manser, Lloyd's Bank Chambers, Poole. Parliamentary agents—Wyatt and Co., St. Stephen's House, Westminster.

PRESTON CORPORATION.—*Inter alia* to enable the Corporation to make three new streets, to construct five additional tramways in Preston and Fulwood, to use lands now belonging to them for the erection of offices and car sheds adjoining the existing generating station and sheds, and to run motor omnibuses within the borough. Solicitor—Alfred Howarth, town clerk, Preston. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

READING CORPORATION.—To enable the Corporation to make two additional tramways, to work trackless trolley vehicles on five specified routes in the borough, and to run motor omnibuses within the borough. Solicitor—W. S. Clutterbuck, town clerk, Reading. Parliamentary agents—Sharpe, Pritchard and Co., 9, Bridge Street, Westminster.

SHEFFIELD CORPORATION.—To enable the Corporation among other things to carry out eleven street widenings, to construct a tramway, and to extend the powers of the Corporation under their Act of 1907 to run motor omnibuses so that they may be able to run these vehicles in specified districts outside the city. Solicitor—W. E. Hart, town clerk, Sheffield. Parliamentary agents—Sherwood and Co., 22, Abingdon Street, Westminster.

ST. ANNE'S-ON-THE-SEA IMPROVEMENT.—Among other things to authorise the Urban District Council to run omnibuses, and to make by-laws for regulating the routes which may be used by motor omnibuses. Solicitor—Thomas Bradley, clerk to the Council, St. Anne's-on-the-Sea. Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

SKEGNESS URBAN DISTRICT COUNCIL.—Among other things to enable the Council to run motor omnibuses. Solicitor—W. Frearson, Skegness. Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

WALSALL CORPORATION.—To enable the Corporation to make a new street and lay a tramway on it, to work coupled and trailer cars on the tramways, to run trackless trolley cars on four specified routes within and outside the borough, to work motor omnibuses in the borough and also along the trackless trolley routes and beyond, and to use trackless trolley vehicles for road watering, for the conveyance of scavenged matter and road metal and for other sanitary or municipal purposes. Solicitor—Herbert Lee, town clerk, Walsall. Parliamentary agents—Sharpe, Pritchard and Co., 9, Bridge Street, Westminster.

YORK CORPORATION.—To authorise the Corporation, among other things, to work trackless trolley vehicles on four routes in the city, to work motor omnibuses throughout the city, and to exempt special carriages or services of carriages from the restrictions as to fares contained in the York Corporation Light Railways Orders, 1908 and 1912. Solicitor—P. J. Spalding, town clerk, York. Parliamentary agents—Sharpe, Pritchard and Co., 9, Bridge Street, Westminster.

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A ROTHERHAM PROVISIONAL ORDER.—In addition to the above applications, Rotherham Corporation propose to ask the Board of Trade for a Provisional Order for the construction of a few tramway lines.

## EDISON ACCUMULATORS FOR TRACTION WORK.

There is now a prospect of a substantial advance being made in this country in the use of the Edison accumulator for automobile road vehicles of various classes. On Thursday afternoon the new premises of Edison Accumulators, Limited, situated at 2 and 3, Duke Street, Piccadilly, London, were formally inaugurated. A large company of invited guests inspected the fine new building which has been erected, and made an examination of a number of motor cars fitted with Edison batteries and electric drive. Subsequently the guests were entertained to luncheon, Lord Montagu of Beaulieu, chairman of the company, presiding.

The company, after a preliminary period of organisation are now, we understand, in a position to supply various classes of electric vehicles, both for pleasure and industrial purposes. The Edison battery, in the meantime, will not be manufactured in this country, but will be imported from America. The vehicles themselves will, of course, be produced by various well-known British firms. Special attention, it is believed, will be devoted to industrial vehicles. The extraordinary durability and low cost of maintenance of the Edison storage battery, in which steel and nickel take the place of lead, are now well known.

Mr. W. R. Cooper, speaking at the luncheon, declared that this was the opening of a new era. It was the re-incarnation of the electric vehicle in this country. He referred to the scepticism which still existed owing to the failure of lead accumulators in the past, and pointed out the advantages of the Edison cell, arising from the facts that it was made of steel, that it might be left in a discharged condition without injury, that it could be charged at a very high rate without doing any harm, and that it had a long

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life. He quoted figures to show the enormous progress made by the electrical vehicle in the United States, and asked why we should not make similar progress in this country. The price of petrol was going up, while the price of electrical energy was continually going down. He proposed the toast of prosperity to the Edison Accumulators Company.

Lord Montagu of Beaulieu, in replying, said that he was not prepared to make any extravagant claims for the Edison battery. It was good enough in itself to convert all those who tried it to a favourable opinion of its merits. He would not have become chairman of the British company devoted to the commercial exploitation of this type of battery unless he had been convinced that the prospects of success were favourable, and that the article was genuine. When he was in the United States last year nothing had struck him more than the very large use of electric vehicles. Nobody would claim that the most perfect electric car fitted with the most perfect battery could take the place of the most perfect petrol car, but there was an enormous field for the electric vehicle, as, for example, the electric runabout used in towns, and the electric vehicle for carrying heavy goods. The results of various tests showed that it cost with a highly efficient petrol engine a halfpenny per ton-mile for traction, while with the Edison battery the cost was a farthing per ton-mile.

Mr. Bernard Drake, who also responded, expressed the view that there was room for both the petrol and the electric vehicle. When he was in America last year a brewery man told him that his firm had been running trucks with the Edison accumulator for two years. This gentleman said he cared nothing about depreciation, as after two years he wiped off the entire cost of the vehicles by his savings as compared with the time when he employed horses. Those who had tried the electric delivery van assured him that they were quite convinced that it was the cheapest mode of moving a ton a mile. He was also informed that in America it was expected that in the future the lead battery would disappear and that the Edison battery would have the field to itself.

Mr. Seabrook, of the Marylebone electricity department, and Mr. Edgcumbe, of the Kingston-on-Thames electricity department, in responding to the toast of the guests, also spoke warmly in favour of the Edison battery, and the proceedings afterwards closed.

## L.C.C. TRAMWAY MATTERS.

GREENWICH STATION BREAKDOWNS AND TEMPORARY POWER SUPPLY.

At last Tuesday's meeting of the London County Council the Highways Committee presented a report on the above subjects, and stated that in connection with the breakdowns of the plant on January 27, March 10, and April 14 last it was necessary to make arrangements for the repair of the plant, and this work was mainly carried out by the makers of the machines. The accounts rendered were:—British Westinghouse Company, £653 9s. 11d.; John Musgrave and Sons, £262 14s. 4d.; Electric Construction Company, £27 11s. 6d.; total, £943 15s. 9d. With reference to the breakdowns of March 10 and April 14, arrangements were made with adjacent tramway authorities for a temporary supply of power. The amounts payable to these authorities were:—Metropolitan Electric Tramways, £420 3s. 4d.; West Ham Corporation, £238 9s. 6d.; Leyton Urban District Council, £110 13s.; total, £709 5s. 10d. The aggregate was thus £1,713 1s. 7d.

In order to cope successfully with the additional car services to be instituted during the winter months, it was advisable that a supply of power should be provided beyond that which could be obtained from the station owing to the fact that the work in connection with the substitution of turbines for the existing reciprocating engines would be in progress. The Committee had been in communication with the London Electric Supply Corporation, who had offered to provide a maximum supply of 1,800 kw. at a fixed price of £3 per annum per kw., plus .35d. per unit. The Committee were advised that these charges were reasonable, and they proposed that the offer should be accepted. The company would provide the necessary switchgear and meters at their works, and also cable ducts between the Council's line of ducts and the Company's generating station. The Council would have to provide the necessary feeder cable between the company's works and the existing trunk mains to the Lewisham sub-station at a point near Nelson Street, Greenwich. This cable could be supplied under the existing contract with the Western Electric Company. It was proposed that the supply should be taken for a period of from four to six months. The cost would amount to about £1,250 a month, involving expenditure of about £5,000 during the remainder of the current financial year.

In connection with the existing contract with the British Westinghouse Company, amounting to £17,915, for the provision of switchgear at Greenwich power station, the Committee recalled the fact that the company had been allowed to sublet certain portions of the work, including the cables to Johnson and Phillips and the automatic regulators to the British Thomson-Houston Company. The British Westinghouse Company now wished to sublet the cables to Siemens Brothers and Company, and the automatic regulators to Brown, Boveri, Limited, instead of to the firms already agreed upon. There was no objection to this course, and the Committee recommended accordingly.

EXTENSION OF THROUGH RUNNING.

It was necessary, the Committee reported, to provide 150 cars with trolley equipment for operating certain through services, which it was proposed should be instituted at an early date, on a number of routes on which it would be necessary for the cars to be worked on both the conduit and overhead systems, and it was proposed that tenders for the necessary equipment should be invited from selected firms.

APPOINTMENT OF CHARGE SHIFT ENGINEER.

Applications for the post of charge shift engineer at Greenwich power station in succession to Mr. W. W. Warren, resigned, were invited by advertisement, the salary being £250 a year, rising by annual increments of £10 to £300. It was stipulated that candidates should be not less than 28 and not more than 40 years of age, and should have experience in the running and maintenance of high-tension electrical plant, steam turbines, and water-tube boilers. The Committee reported that in response to the advertisement 104 applications were received. After careful consideration the Committee recommended the appointment of Mr. J. J. McGregor, who was at present assistant engineer at the Deptford generating station of the London Electric Supply Corporation.

These reports were adopted as was also the adjourned report by the Improvements Committee in favour of widenings of Wandsworth High Street and East Hill.

## MISCELLANEOUS NEWS AND NOTES.

**New Cars and a Garage for Coventry.**—The City Council have approved of a proposal to spend £10,000 on the purchase of ten new covered top tramcars and £2,140 on extra land at the Priestley Bridge depôt for the erection of an omnibus garage.

**Another All-Night London Omnibus Service.**—On the night of November 13 the London General Omnibus Company instituted a second all-night service of motor omnibuses—No. 94A—between Willesden and Liverpool Street. The service is half-hourly.

**Return Motor Omnibus Fares.**—The London General Omnibus Company on November 24 began another attempt to meet tramway competition by granting return tickets at reduced fares between Parliament Square and certain south-eastern points to Greenwich and Woolwich.

**Burnley Tramways Goods Wagon.**—The period for which the Board of Trade sanctioned the use of a goods wagon in conjunction with a motor car having expired, application has been made to the Board for consent to continue the use of the wagon. This was described in the TRAMWAY AND RAILWAY WORLD of December 12, 1912.

**Sheffield Tramways and Tokens.**—Complaint having been made by users of the Sheffield-Rotherham cars that the Rotherham tokens are not accepted on the Sheffield cars, the general manager of the Sheffield tramways has replied that he hopes shortly to issue instructions which will enable conductors to accept the tokens on all Sheffield tramway and omnibus routes.

**Omnibus Creates Traffic on Tramcar Routes.**—"One of those controlling London's tramway system" is reported as saying:—"The panic talk as to the era of the tramway car having passed was unwarranted. The novelty of the motor omnibuses having worn off, the public are going back. The motor omnibus has also created traffic on the tramway car routes."

**Additional P.A.Y.E. Cars for Aberdeen.**—After inspecting a P.A.Y.E. car with an improved staircase the Tramways Committee have ordered tenders to be invited for the supply of six new cars designed for prepayment of fares. The siding at the Sea Beach is to be extended to accommodate three or four extra cars. A report is to be presented to the Council on the question of additional car shed accommodation, either in the form of an extension or the erection of a more central depôt.

**First Double-Deck Railless Car.**—The double-deck trolley car for railless lines which was referred to in our last issue and which has been sanctioned by the Board of Trade for use on the through railless trolley system to be installed in Brighton and Hove, has been designed and constructed by the R.E.T. Construction Company, Limited, the pioneers of railless traction in this country. Through an error in a local report the name of the makers of the double-deck car was incorrectly given in our last issue.

**Ticket Inspection at Manchester.**—Interviewed with reference to a complaint that ticket inspectors are too numerous, Mr. J. M. McElroy has said:—"We have no more ticket inspectors than are necessary. In fact, we have not enough. We are collecting nearly one million pounds, or near that, every year, and we are carrying four million passengers per week. We have less than forty ticket inspectors on the whole system, and their hours are so arranged that they are on duty the whole time the cars are running, which is now day and night."

**Traffic Inducement at Belfast.**—Complaint was made at a meeting of the Corporation recently that £20,000 had been allowed for the laying out of Bellevue Gardens, but Mr. Nance the tramways manager, had obtained £5,000 above that sum. Alderman Tyrrell replied that if Mr. Nance acting for the committee and the public had exceeded his estimate by a few thousand pounds, it was in keeping with many laudable undertakings that had been carried through by the Corporation. When the gardens were completed the public would be as satisfied with the work.

**Proposed Signalling Apparatus at Hull Bridges.**—Pending the presentation of a report by the city engineer on a proposal to install electrical signals at bridges, the Hull Tramways Committee have adopted a suggestion made by the general manager that orderly boys should be stationed at given points to operate signals so that arrangements could be made to divert tramcars to other available routes when a bridge is about to be opened to allow shipping to pass. The engineer has been in negotiation with a number of firms with regard to the supplying of an apparatus, but he has experienced great difficulty in obtaining designs of anything that would be suitable.

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**Sequel to a Broken Grab Rail.**—In a claim made against Salford Corporation for £20 as damages for personal injuries the plaintiff stated that she stood on the platform waiting for the guard to descend from the top of the car. Opposite Teneriffe Street the car lurched or oscillated, causing her to lose her balance, and to regain it she seized the centre grab rail above the steps. The rail gave way outwards, and she fell into the roadway. For the defence the guard admitted that the rail was broken, but denied that there was any lurching or oscillation of the car. He had never seen a grab rail broken before. There was a rule that such defects should be reported at once, but there was no inspector to report to at Heaton Park, and he did not see one until just after this occurrence. Three passengers in the car said that in their view the accident was due to plaintiff jumping off the car while it was travelling. The jury gave a verdict for the Corporation, and judgment was entered accordingly.

**Bournemouth and the Municipal Tramways Conference.**—The delegates appointed to represent the Bournemouth Corporation tramways at the recent Conference of the Municipal Tramways Association presented a report on the proceedings to the last meeting of the Council for the municipal year. Besides the enlightenment gained from the several papers submitted, the delegates stated that valuable information was obtained as to the latest form of trackless trolley vehicles at Bradford and Rotherham, and also in the informal meetings held in the evenings in comparing notes as to conditions and positions existing in other towns. Mention was also made of a visit to the works of the United Electric Car Company at Preston. Among the cars going through the works were 75 of the latest Birmingham cars, others for Buenos Ayres, Peru, Russia, etc. Several features were noted for incorporation in the next lot of cars to be constructed for Bournemouth.

**"Meldrum" Improved Forced-Draught Furnace.**—In view of the increased attention devoted to the reduction of working costs by power station engineers, the latest literature issued by Meldrums, Limited, engineers, Timperley, near Manchester, will prove of interest. A 12-page illustrated booklet gives a full description of the improved forced-draught furnace. More than 15,000 of these have been fitted. The principle on which the furnace works is that of steam-jet forced draught, created by specially designed blowers. This is claimed to be the simplest and most economical method, giving better control of the fire and using the smallest amount of steam in proportion to the work done. The average steam consumption, although varying somewhat according to the nature of the fuel and other conditions, is given as being from three to four per cent. of the steam generated. The "Meldrum" furnace, it is stated, prevents clinker adhering to the bars, which are thereby kept cool and their life prolonged, while the saving in bars, the thorough burning of the fuel, and the prevention of waste through the grate, more than compensate for the steam used. Other attributes are fuel economy, increased steaming, and smoke prevention. The furnaces are fitted on the principle of "no cure no pay" anywhere in the United Kingdom. Particulars are also given of the "Sprinkler" stoker with fixed grate and forced draught and the "Koker" stoker with forced draught.

**Imperial Motor Transport Council.**—This Council has been formed as a result of the unanimous desire of upwards of two hundred Colonial delegates, who attended the Imperial Motor Transport Conference held in London in July last. The Council will work in close touch with the Royal Automobile Club, the chairman of the club (Hon. Arthur Stanley) being also chairman of the Council, and the meetings of the Council being held at the club. To enable the Council to deal promptly with inquiries relating to the selection of industrial motor vehicles for service abroad, or the operation of vehicles in such service, a small Technical Inquiries Sub-Committee has been formed. This sub-committee consists of:—Mr. W. Worby Beaumont, consulting engineer to the Chief Commissioner of Police and to the Royal Automobile Club (chairman), Mr. Ashton M. Heath, chief inspecting engineer to the Crown Agents for the Colonies, Mr. H. E. Wimperis, inspecting engineer to the Crown Agents for the Colonies, and Mr. Horace Wyatt, who will also act as hon. secretary of the sub-committee. The Council is in course of forming an Alcohol Motor Fuel Committee in accordance with the request of the delegates. This committee will conduct investigations and experiments relating to the use of alcohol as a motor fuel, the general opinion having been expressed by the delegates that considerable support would be forthcoming from the Dominions and Colonies in aid of work assisting towards the production of a permanent adequate supply of fuel within the Empire.

**Future Developments at Glasgow.**—Councillor Kirkland, chairman of the Tramways Committee, on the occasion of the annual inspection of the tramways undertaking on November 20, mentioned that application was being made to Parliament for power to construct some 21 miles of double track, and indicated that the connecting up of Glasgow with Coatbridge, Cathkin Braes, Millerston, and Milngavie would complete the circling of the city by the system. The Corporation were seeking powers to construct a bridge over the Clyde from Oswald Street to Commerce Street. That would, he believed, materially lessen the great and growing congestion in the centre of the city. He hoped the Corporation would build a second bridge from Dixon Street to South Portland Street. They had 850 cars in stock, and the general manager had been authorised to proceed with the construction of an additional 150 cars. In January, 1911, the two-stage fare was inaugurated. That was but the stepping-stone to the doubling of the halfpenny distance. The further reduction which took place in December of that year brought a temporary decline in the revenue, and in a short time the department were drawing a greater revenue than ever. At the end of the year they expected that the revenue would show an increase of £50,000 over the £1,007,652 received in the previous year. Should the Corporation see their way to increase the 1d. distance from four to six stages and the 1½d. from six to nine stages, and so on, that would be a great boon.

## CONTRACTS AND ORDERS.

**Warrington Council** have allotted contracts as follow:—Low tension cable, the Union Cable Company, Limited; switchboard feeder panel, Drake and Gorham, Limited.

**Sunderland Council** have allotted contracts as appended:—Union Cable Company and L.R. and G.P. Company, cable; E. Green and Sons, new sections and parts for economiser.

**London County Council** have accepted the following tenders:—Hardy and Padmore, three dozen each cast iron feeder pillar cases and cases, £240 8s. 9d.; J. Billingham, Cradley Heath, twelve tons of standard flanged treadplate, £198 18s.

**Canadian General Electric Company, Limited,** have secured the contract for equipping the sub-station at Rougemont, of the Montreal and Southern Counties Railway; a 300 kw. motor-generator set, a bank of transformers, high and low-tension switchboards, lightning arresters and switching apparatus.

**Leicester Council** have placed the following contracts:—United Electric Car Company, 12 top covers for cars; Walter Scott, Limited, 180 tons of steel rails and six tons of fish-plates, £1,273 10s.; T. Wragg and Sons, Limited, 2,800 yards of single way stoneware conduits, 4in. diameter, £136 10s.; Bayliss, Jones, and Bayliss, Limited, 1,000 steel tie bars in three lengths, £79 3s. 4d.; and Ibbotson, Bros., and Co., Limited, six tons of bolts, nuts, and washers, £141.

**Glasgow Council** have accepted tenders as subjoined for the tramways department:—Cast steel pipe connections, Babcock and Wilcox, Limited; cast iron pipe connections, Macfarlane, Strang and Co., Limited; slide valves, Dewrance and Co.; trolley feed cable, St. Helen's Cable Co.; insulated bolts, W. C. Yuille and Co., Ltd., and J. Hally Craig; traction lamps, General Electric Company, Limited; double cotton-covered copper wire, B.I. and Helsby Cables Limited; overhead crane, Alex. Jack and Co.; tower wagon chassis, Halley's Industrial Motors, Limited; steel work, etc.; Dalhousie depôt, Redpath, Brown and Co., Limited; trolley wire, F. Espir.

## PERSONAL.

**Mr. F. O. C. Nash,** who has been in charge of the tramway extensions on the west of Newcastle-on-Tyne, has received an appointment under the Town Planning Act with the Birmingham Corporation. Mr. Nash is an officer in the Territorial Force.

**Alderman J. Smethurst,** J.P., has resigned the chairmanship of Warrington Tramways and Electricity Committee after ten years' service. Both undertakings have proved very successful, and the ex-chairman's work has been cordially referred to by the Council and the local newspapers.

**Mr. Walter T. Young,** who for two years has been traffic superintendent, Oldham Corporation tramways, has been appointed to a similar position under the West Ham Corporation. Before going to Oldham he served under the Aberdeen Corporation for 14 years, and for four years was traffic superintendent.

**Mr. J. J. McGregor,** assistant engineer at the Deptford generating station of the London Electric Supply Corporation, has been appointed charge shift engineer at the London County Council's Greenwich generating station in succession to Mr. W. W. Warren, resigned. The salary is £250 a year, rising by annual increments of £10 to £300. There were 140 applications.

**Mr. Charles Furness,** general manager, Blackpool Corporation tramways, and borough electrical engineer, has received from the Tramways Committee an increase of £200 in his salary of £700 per annum. Improvements introduced by Mr. Furness, including the open touring cars on the circular route, helped to increase the receipts to £74,166, as compared with £42,572 in 1904. For the 8½ months of the present year the receipts have reached £73,018, and it is estimated that by the end of the year the total will be £85,000. The profit in 1904 was £1,032 and last year £18,331, while for the present year the estimate is £25,000.

**Mr. J. Dalrymple,** general manager, Glasgow Corporation tramways, was referred to by the chairman of the Tramways Committee in the remarks which he made at the luncheon on the occasion of the annual inspection of the various departments. Ex-Bailie Kirkland observed that during the year they had increased the wages of the employees in every section with the exception of the general manager. The maximum wage of motormen and conductors had been raised from 33s. to 34s. per week, and next year it would be further increased to 35s. per week. The cars, the chairman added, were carrying 337 millions of passengers per annum.

**Mr. C. W. Shepherd,** general manager, Edinburgh Tramways Company, at one of the three annual concerts on November 21 in aid of the Tramways Employees' Widows' and Orphans' Fund, was congratulated by Mr. B. Hall Blyth, the chairman of the company, on being present after the serious illness which he had gone through. Sir Robert Maule, one of the directors, who presided at one of the other concerts, made a similar observation. These concerts, which were originated by Mr. Shepherd, have contributed £2,450 to the funds, of which sum £1,300 is invested. The employees each first contributed 4s. 4d. and now 6s. 6d. annually, and in ten years their contributions have totalled £1,490.

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# FINANCIAL REPORTS AND MEETINGS.

**Isle of Thanet Electric Tramways and Lighting Company.**—The directors recommend a dividend of 3 per cent. on the preference shares for year ended September 30 and transfer of £2,000 to rolling stock reserve. After placing £6,000 towards future maintenance of permanent way and £1,000 to third party insurance reserve, £3,108 remains to be carried forward. For each of the three preceding years 2½ per cent. was paid on the preference shares.

**The British Electrical Federation.**—The traffic statement for the week ended November 21, 1913, shows that the receipts from tramways and railways amounted to £37,077, as compared with £34,422 in the corresponding week last year, and from omnibuses £11,704, as compared with £1,360, making a total of £48,781, as compared with £35,782. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show an increase of £2,498 upon the week.

**Relining of Bearings.**—The Hoyt Metal Company of Great Britain, Limited, 26, Billiter Street, E.C., have issued a circular containing hints on the relining of bearings with Hoyt's internal combustion engine bearing metal. The publication is intended more especially for the guidance of the mechanician who may happen to have had somewhat limited experience in that particular direction, but a number of points are given which the experienced man should find interesting.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended November 22 amounted to £222,277, or £13,203 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £77 13s. 3d. per track mile, an increase of £2 10s. 3d. per mile as compared with last year.

(*Continued from page* 468.)

## ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria is prepared to receive tenders for

Copper Track Bonds and Accessories

for use in connection with the electrification of the Melbourne Suburban Railways (approximately 300 miles of single track) now being carried out.

Specification and form of tender may be obtained from the Agent-General for Victoria on or after Wednesday, November 26, 1913. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to the Consulting Engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification in duplicate is £5 5s. and £2 2s. each for any further copies. Sums paid for copies will be refunded on receipt of a *bonâ-fide* tender for the whole of the work included in the specification.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways, Tender for Track Bonds," are to be addressed to the Agent-General and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 noon on Monday, December 22, 1913.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

## POSITIONS VACANT.

### CITY OF BIRMINGHAM.

ELECTRIC SUPPLY DEPARTMENT.

APPOINTMENT OF DRAUGHTSMEN.

A Senior Draughtsman and a Junior Draughtsman are required by the above Department for the lay-out of a large Electrical Power Station, Boilers, Piping, etc. Only men who have been employed on a similar class of work need apply.

The commencing salary for the Senior Draughtsman will be £130 per annum, rising to £160 at the discretion of the Electric Supply Committee.

The commencing salary for the Junior Draughtsman will be £80 per annum, rising to £130 at the discretion of the Electric Supply Committee.

Applications to be made, not later than Monday, December 15, on the form to be obtained from the Secretary of the Department.

R. A. CHATTOCK,
City Electrical Engineer and Manager.

14, Dale End, Birmingham.

### PERMANENT WAY FOREMAN.

Permanent Way Foreman wanted for a small Tramway System of 20 miles route. Applicants to state experience in plate laying, etc., and wage expected. Address, Box 218, c/o THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, W.C.

### BUYING AGENTS.

Experienced and responsible New York firm, now buying for important foreign interests and enjoying favourable relations with many manufacturers—especially in Railway Materials and Equipment—can handle other accounts to advantage. It is hoped that this announcement may favourably interest railways, firms, or individuals needing, in the United States, agents capable of giving better than the usual attention to purchases and shipments from that country. Unquestionable references will be furnished. All correspondence considered confidential.

Address, Broadway, c/o THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, W.C.

## COPPER AND ALUMINIUM MARKET.

November 28, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, November 28. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 66 15 0 | 66 15 0 | 76 12 6 |
| ,, ,, (three months) .. | 65 5 0 | 65 12 6 | 78 7 6 |
| Electrolytic Copper—bars or ingots | 69 5 0 | 70 10 0 | 82 0 0 |
| Aluminium—bars or ingots .. .. | 83 0 0 | 83 0 0 | 85 10 0 |

## COAL MARKET.

November 28, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, November 28. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 25 6 | 25 6 | 23 3 | 22 3 |
| Best Seconds .. .. .. | 24 9 | 24 9 | 23 3 | 21 9 |
| Ordinary Drys .. .. | 22 3 | 22 0 | 21 6 | 20 4½ |
| Best Washed Nuts .. | 21 0 | 21 0 | 21 3 | 19 6 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 19 9 | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 0 | 21 0 | 18 0 | 17 3 |
| Best Seconds .. .. | 20 3 | 20 3 | 17 6 | 16 9 |
| Ordinary Drys .. .. | 17 9 | 17 6 | 15 9 | 15 4½ |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 15 6 | 14 0 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 14 0 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 0 | 15 0 | 14 3 | 12 3 |
| Best Seconds .. .. | 13 0 | 13 0 | 13 6 | 11 0 |
| Smalls .. .. .. | 7 0 | 7 0 | 10 6 | 6 3 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Nov. 25 | £55,577 | £58,239 | 47 | £2,605,049 | +£159 903 |
| Auckland (28 days) | Nov. 21 | 19,174 | 10,497 | 21 | 92,254 | — 4,949 |
| Ballarat and Bendigo | Sept. 28 | 1,095 | 883 | 26 | 22,632 | — 515 |
| Brazilian St. Rly. Mlrs. | October | 44,563 | 52,219 | 13 | 153,572 | + 26,509 |
| Brazilian Traction | Nov. 15 | 85,852 | 93,861 | ... | ... | ... |
| Brisbane | October | 23,017 | 27,250 | 43 | 260,015 | + 55,907 |
| British Columbia $ | Sept. | 688,069 | 734,283 | 13 | 2,260,854 | + 247,268 |
| Buenos Aires Pt. & City | July | 6,124 | 6,513 | 30 | 46,073 | + 1,750 |
| Buenos Aires Lacroze | October | 44,660 | 45.579 | 17 | 179,524 | + 7,826 |
| Calcutta Rs. | Nov. 22 | 64,320 | 67,754 | 47 | 30,29,600 | + 1,47,817 |
| Cape Town | Sept. | ... | 11,290 | ... | ... | ... |
| Carthagena & Herrerias | October | 2,376 | 1,582 | 43 | 26,213 | + 4,601 |
| Cordoba | October | 12,524 | 13,285 | 30 | 94,023 | + 9,230 |
| East India | October | 1,911 | 1,878 | 13 | 5,911 | + 147 |
| Kalgoorlie | October | 2,955 | 2,652 | 43 | 29,099 | — 2,644 |
| La Plata | October | 5,008 | 4,920 | 43 | 50,481 | + 9,327 |
| Lima | Sept. | 22,660 | 34,110 | 39 | 300,647 | + 23,783 |
| Lisbon Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Nov. 15 | 24,262 | 24,050 | 45 | 560,783 | + 37,905 |
| Melbourne | October | ... | 65,000 | ... | ... | ... |
| Mexico $ | October | 586,273 | 616,007 | 43 | 5,732,338 | + 137,633 |
| Montevideo | Sept. | 27.711 | 27,870 | 47 | 344,301 | + 26,483 |
| Para | Nov. 23 | 3,941 | 3,284 | 51 | 203.184 | — 2,266 |
| Port Elizabeth | Sept. | ... | 3,071 | ... | ... | ... |
| Shanghai $ | Nov. 19 | 20,712 | 24,000 | 46 | 1,025,999 | + 121,084 |
| Singapore $ | Nov. 22 | 10,690 | 11,570 | 47 | 563,051 | + 78,593 |
| Toronto $ | Sept. | 767,944 | 865,796 | 39 | 7,183,470 | + 962,426 |
| Winnipeg $ | Sept. | 309,722 | 331,732 | 39 | 2,981,434 | + 243,882 |

**DICK, KERR & CO.,**
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**ABCHURCH YARD, CANNON STREET, LONDON, E.C.**
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**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation | Nov. 19 | £1,347 | £1,472 | + £125 | 25 | £41,695 | + £2,696 |
| Accrington Corp. | ,, 19 | 507 | 562 | + 55 | 33 | 19,280 | + 1,825 |
| Ayr Corporation | ,, 22 | 195 | 239 | + 44 | 27 | 11,996 | + 1,685 |
| Bath Electric | ,, 19 | 690 | 736 | + 46 | 47 | 45,492 | + 3,644 |
| Birkenhead Corp. | ,, 23 | 1,135 | 1,225 | + 90 | 34 | 41,135 | + 4,324 |
| Birmingham Corp. | ,, 22 | 11,121 | 12,285 | + 1,164 | 34 | 396,838 | + 35,019 |
| Blackburn Corporation | ,, 19 | 1,113 | 1,139 | + 26 | 34 | 45,459 | + 4,234 |
| Blackpool & Fleetwood | Oct. 25 | 921 | 467 | + 146 | 17 | 27,482 | + 4,607 |
| Blackpool Corporation | Nov. 20 | 432 | 504 | + 72 | 33 | 73,523 | + 11,815 |
| Bolton Corporation | ,, 20 | 2,560 | 2,604 | + 44 | 34 | 93,588 | + 5,406 |
| Bournemouth Corp. | ,, 26 | 1,445 | 1,658 | + 213 | 34 | 75,671 | + 9,012 |
| Bradford Corporation | ,, 22 | 5,389 | 5,589 | + 200 | 34 | 203,126 | + 12,570 |
| Brighton Corporation | ,, 23 | 823 | 893 | + 70 | 34 | 32,743 | + 2,815 |
| Bristol | ,, 21 | 6,432 | 7,275 | + 843 | 46 | 375,140 | + 51,050 |
| British Elec. Federatn. | ,, 21 | 35,782 | 48,781 | * | ... | ... | ... |
| Burnley Corporation | ,, 22 | 1,453 | 1,579 | + 116 | 34 | 58,529 | + 6,913 |
| Burton-on-Trent Corp. | ,, 23 | 264 | 270 | + 6 | 34 | 9,974 | + 498 |
| Bury Corporation | ,, 23 | 1,225 | 1,254 | + 29 | 34 | 45,501 | + 1,866 |
| Cardiff Corporation | ,, 22 | 2,373 | 2,684 | + 311 | 34 | 98,815 | + 10,232 |
| Chatham and District | ,, 20 | 777 | 848 | + 71 | 46 | 41,111 | + 2,818 |
| Chesterfield Corp. | Oct. 23 | 235 | 256 | + 21 | 29 | 7,716 | + 955 |
| Colne & Trawden | Nov. 22 | 247 | 241 | — 6 | 47 | 12,878 | + 773 |
| Cork Electric | ,, 20 | 443 | 457 | + 14 | 46 | 23,281 | + 655 |
| Croydon Corporation | ,, 14 | 1,646 | 1,570 | — 76 | 32 | 54,777 | + 5,457 |
| Darlington Corporation | ,, 22 | 227 | 251 | + 24 | 34 | 8,527 | + 845 |
| Derby Corporation | ,, 22 | 870 | 929 | + 59 | 34 | 33,841 | + 3,528 |
| Dover Corporation | ,, 23 | 188 | 197 | + 9 | 34 | 8,912 | + 210 |
| Dublin & Lucan | ,, 21 | 112 | 110 | — 2 | 20½ | 3,122 | — 33 |
| Dublin United | ,, 21 | 5,436 | 4,722 | — 714 | 46 | 255,511 | — 15,080 |
| Dundee City | ,, 19 | 1,149 | 1,261 | + 112 | 27 | 35,824 | + 2,763 |
| East Ham Corporation | ,, 22 | 1,020 | 990 | — 30 | 34 | 34,873 | - 1,443 |
| Exeter Corporation | ,, 21 | 276 | 292 | + 17 | 34 | 12,044 | + 632 |
| Gearless Motor 'Buses | ,, 22 | ... | 474 | ... | 33 | 16,500 | ... |
| Glasgow Corporation | ,, 22 | 19,083 | 20,361 | + 1,278 | 25 | 507,209 | + 37,613 |
| Glossop(U.Elec.Supply) | ,, 22 | 119 | 119 | ... | 47 | 6,094 | + 5.6 |
| Halifax Corporation | ,, 18 | 1,823 | 1,865 | + 42 | 33 | 71,860 | + 2,437 |
| Hastings & District | ,, 20 | 725 | 781 | + 56 | 33 | 49,408 | + 3,644 |
| Huddersfield Corp. | ,, 22 | 2,009 | 2,007 | — 2 | 34 | 72,961 | + 4,562 |
| Hull Corporation | ,, 22 | 2,978 | 3,164 | + 186 | 34 | 106,816 | + 5,920 |
| Ilford U.D.C. | ,, 22 | 389 | 428 | + 39 | 34 | 15,463 | — 1,046 |
| Ilkeston Corporation | ,, 26 | 114 | 125 | + 11 | 35 | 4,695 | + 744 |
| Ipswich Corporation | ,, 22 | 351 | 393 | + 42 | 34 | 16,317 | + 723 |
| Isle of Thanet | ,, 22 | 275 | 333 | + 58 | 8 | 3,202 | + 333 |
| Kilmarnock Corp. | ,, 15 | 152 | 165 | + 13 | 26 | 4,714 | + 328 |
| Lanarkshire | ,, 20 | 1,526 | 1,707 | + 181 | 46 | 79,280 | + 10,139 |
| Lancashire United | ,, 19 | 1,291 | 1,557 | + 266 | 46 | 72,070 | + 8,841 |
| Leeds City | ,, 22 | 7,735 | 7,956 | + 221 | 34 | 282,722 | + 18,063 |
| Leicester Corporation | ,, 22 | 2,581 | 2,776 | + 195 | 47 | 131,724 | + 12,224 |
| Leith Corporation | ,, 22 | 619 | 637 | + 18 | 27 | 19,850 | + 919 |
| Leyton U.D.C. | ,, 13 | 1,262 | 1,286 | + 24 | 32½ | 44,344 | — 543 |
| Liverpool Corporation | ,, 22 | 11,991 | 12,719 | + 728 | 47 | 604,015 | + 45,623 |
| Llandudno & Colwyn B. | ,, 21 | 141 | 156 | + 15 | 51 | 17,519 | + 1,480 |
| London County Council | ,, 19 | 40,248 | 42,565 | + 2,317 | 33 | 1,406,434 | + 1,130 |
| London Gnl. Omnibus | ,, 22 | 55,947 | 57,083 | + 1,136 | 47 | 2,910,663 | + 500,818 |
| London United | ,, 21 | 5,405 | 5,668 | + 263 | 47 | 296,054 | + 6,086 |
| Lowestoft Corporation | ,, 22 | 183 | 195 | + 32 | 7 | 1,522 | + 135 |
| Maidstone Corporation | ,, 20 | 156 | 196 | + 40 | 34 | 7,170 | + 508 |
| Manchester Corp. | ,, 22 | 16,777 | 17,344 | + 567 | 34 | 599,963 | + 31,541 |
| Met. Elec. Trys. | ,, 21 | 8,212 | 8,691 | + 479 | 47 | 424,872 | + 14,942 |
| Nelson Corporation | ,, 22 | 185 | 179 | — 6 | 34 | 7,234 | + 423 |
| N'castle-on-Tyne Corp. | ,, 22 | 4,541 | 4,994 | + 453 | 34 | 165,929 | + 15,575 |
| Newport (Mon.) Corp. | ,, 21 | 687 | 766 | + 79 | 34 | 26,292 | + 2,178 |
| New St. Helens & Dist. | ,, 19 | 670 | 741 | + 71 | 21 | 17,845 | + 1,931 |
| Northampton Corp | ,, 21 | 486 | 540 | + 54 | 34 | 19,889 | + 1,361 |
| Nottingham Corp. | ,, 20 | 3,100 | 3,318 | + 218 | 33½ | 113,479 | + 5,352 |
| Oldham Corporation | ,, 23 | 1,934 | 2,191 | + 197 | 35 | 77,719 | + 5,427 |
| Portsmouth Corp. | ,, 22 | 1,819 | 1,919 | + 300 | 34 | 80,883 | + 5,518 |
| Preston Corporation | ,, 19 | 771 | 830 | + 59 | 34 | 30,291 | + 1,934 |
| Provincial | ,, 22 | 1,511 | 1,604 | + 93 | 8 | 13,345 | + 894 |
| Reading Corporation | ,, 20 | 579 | 643 | + 64 | 33 | 23,706 | + 1,901 |
| Rochdale Corporation | ,, 22 | 1,418 | 1,486 | + 68 | 34 | 55,303 | + 2,388 |
| Rotherham Corp. | ,, 26 | 860 | 1,011 | + 151 | 34 | 34,599 | + 8,044 |
| Salford Corporation | ,, 24 | 5,870 | 5,615 | + 245 | 34 | 179,345 | + 7,478 |
| Sheffield Corporation | ,, 23 | 7,048 | 7,435 | + 387 | 35 | 255,093 | + 21,374 |
| Southampton Corp. | ,, 19 | 1,044 | 1,206 | + 162 | 33 | 45,449 | + 2,935 |
| Southend-on-Sea Corp. | ,, 19 | 534 | 700 | + 166 | 34 | 34,579 | + 6,020 |
| South Met. Trys. | ,, 21 | 725 | 1,023 | + 298 | 47 | 43,758 | + 4,213 |
| South Shields Corp. | ,, 22 | 585 | 676 | + 91 | 34 | 24,775 | + 3,071 |
| Sunderland Corp. | ,, 23 | 1,262 | 1,370 | + 108 | 34 | 49,803 | + 5,096 |
| Sunderland District | ,, 19 | 474 | 535 | + 61 | 3 | 1,613 | + 176 |
| Swindon Corporation | ,, 19 | 148 | 153 | + 5 | 31 | 5,654 | + 374 |
| Trys. (M.E.T.) 'Buses | ,, 22 | ... | 8,166 | ... | 43 | 231,654 | ... |
| TynesideTrys.&Tmrds | ,, 19 | 454 | 487 | + 13 | 21 | 11,061 | + 722 |
| Wallasey Corporation | ,, 22 | 1,008 | 1,079 | + 71 | 34 | 42,495 | + 4,021 |
| Walsall Corporation | ,, 22 | 582 | 643 | + 51 | 47 | 23,298 | + 2,142 |
| Walthamstow U.D.C. | ,, 22 | 609 | 703 | + 94 | 34 | 25,715 | + 780 |
| Warrington Corp | ,, 20 | 421 | 457 | + 36 | 34 | 15,017 | + 531 |
| West Ham Corporation | ,, 20 | 2,501 | 2,668 | + 167 | 33 | 91,883 | + 3,590 |
| Wigan Corporation | ,, 21 | 1,343 | 1,496 | + 154 | 33½ | 50,068 | + 5,048 |
| Wolverhampton Corp | ,, 26 | 1,009 | 1,041 | + 32 | 35 | 37,624 | + 2,139 |
| Yorkshire (W. Riding | ,, 23 | 1,283 | 1,393 | + 111 | 47 | 68,212 | + 7,104 |

* From such of the services as were working both last year and this year the receipts show an increase of £2,498 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Nov. 22 | £5,494 | £5,252 | — £242 | 47 | £228,258 | + £6,069 |
| City and South London | ,, 22 | 2,899 | 2,816 | — 83 | 47 | 130,743 | — 12,272 |
| Liverpool Overhead | ,, 23 | 1,525 | 1,686 | + 161 | 47 | 80,765 | + 6,086 |
| London Electric | ,, 22 | 14,050 | 14,350 | + 300 | 47 | 639,275 | + 1,440 |
| Mersey | ,, 22 | 2,281 | 2,283 | — 43 | 47 | 105,023 | + 4,771 |
| Metropolitan | ,, 23 | 16,316 | 17,981 | + 1,665 | 47 | 809,578 | + 28,239 |
| Metropolitan District | ,, 22 | 13,238 | 13,440 | + 202 | 47 | 609,642 | + 17,936 |

**The Tramway & Railway World** can be obtained, post free, at the following rates:—

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**AMBERLEY HOUSE, NORFOLK ST., W.C.**

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations. November 28. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 69 — 71 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅞ — 4⅛ |
| 5 | Do. 5½% Cum. 2nd Pref. | ... | 4¼ — 4⅜ |
| 100 | Do. 4% Deb. Stk. Red. | ... | 89½ — 91½ |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 97½ — 99½ |
| 100 | Do. 5% Deb. Stk. Red. | — 2½ | 96 — 98 xd |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | + ½ | 101½ —103½ |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref | ... | 2⅛ — 2⅜ |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| | Bombay Elec. Supply and Trams. Co., Ord. | ... | 11¾ — 12¼ |
| 10 | Do. do. 6% Cum. Pref. | — 1 | 10½ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | + 2½ | 84½ — 90½ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7½ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅜ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. | — ¼ | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 6¼ — 6¾ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | + 1 | 115 —120 |
| 100 | Do. Pref. Ord. Stock | + ½ | 103 —107 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock. | + 2½ | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. | + 1 | 98 —101 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. | ... | 92 — 95 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | + 1½ | 87 — 90 |
| 10 | Do. 7% Non-Cum. Pref. | — ⅛ | 49¾ — 52½ |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 10 — 13 |
| 100 | Do. Deferred Ord. Stock | ... | 3¼ — 5¼ |
| 100 | Do. 5% Perpetual Debenture Stock | ... | 90 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Rec | ... | 77 — 80 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., 5% 1st Mrt. Deb | ... | 98½ —100½ |
| 5 | Calcutta Tramways Co., Limited. Ord. | ... | 5⅝ — 6⅜ |
| 5 | Do do. 5% Cum. Pref. | ... | 4⅛ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., | ... | ⅜ — ⅜ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim | ... | 3 — 3¾ |
| 100 | Do. 5% Debs. Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | + 1/16 | 5¼ — 5½ |
| 100 | Do. 4% Debenture Stock Red, 1985 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 88 — 92 |
| 100 | Companhia Ferro Carrildo Jardim Botanico, 5% 1st Mt. | + ⅛ | 95 — 97 |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | — ⅛ | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | — ¼ | — 10½ |
| 10 | Do. do. 6% Pref. | — ¼ | — 11¾ |
| 100 | Do. do. "A" Red. | ... | — 73½ |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 79 xd |
| 10 | Gateshead & Dist Trys. Co., Ord. | ... | 9 — 9½ |
| 10/- | Hastings & Dist. Electric Trams. Co. Ld., Ord. | ... | ⅜ — ⅝ |
| 1 | Do. do. 6% Cum. Pref. | ... | ⅛ — ¼ |
| 100 | Do. do. 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94¼ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 87 — 92 |
| 10 | Imperial Tramways, Ord. | ... | 3¾ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. | ... | 6½ — 6¾ |
| 100 | Do. do. 4½% Deb. Stock | ... | 76¼ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | + 1/16 | 2⅛ — 2⅝ |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — 1/16 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 |
| 100 | Do. do. 6% "B" do. | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | ⅞ — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¾ — 10¼ |
| 100 | Lancashire United Tramways, 5% Prior Lien Deb. | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | + 1/16 | 1⅛ — 1⅝ |
| 1 | Do. 6% Cum. Pref. | ... | ⅛ — 1⅜ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | 1/16 — 5/16 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 95 — 97 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 85 — 87 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 58 — 62 |
| 10 | Madras Electric Trams. (1904), Lim., 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 5 | Do. do. 5% Deb. Stk., Red. | ... | 101 —103 |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 85 — 87 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | + 1½ | 109½ —112½ |
| $1,000 | Do. do. 5% Bds. | ... | 98¼ — 98½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | — 1/32 | 7/8 — 1 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 82 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| $100 | Mexico Tramways Co., Common Stock | ... | 78 — 81 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 80 — 85 |
| 100 | Do. 6% 50-yr. Mort. Bonds | + 1 | 83 — 83 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | + 1 | 90½ — 92½ |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1923) | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. | + 1/16 | 1⅛ — 1⅜ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 5⅞ — 6⅛ |
| 10 | Do. do. 5% Cum. Pref. | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Elys. and Ltg. Co., Ord. | + ⅛ | 5⅜ — 6¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 1/16 — 1/8 |
| 1 | Do. 5% Cum. Pref. | ... | 1/16 — 1/8 |
| 100 | Do. 4½% Debenture Stock, Red. | + 3 | 83 — 86 |
| 1 | Provincial Tramways, Lim.. Ord. | — 1/16 | 33/32 — 35/32 xd |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 82 — 85 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. | ... | 5⅛ — 5⅜ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 97 — 99 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 84 — 87 |
| $500 | Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds. | + 1 | 99 —101 |
| 100 | Do. do. 5% 50-yr. Mort. Gold Bonds | + 1 | 89 — 91 |
| 10 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 99 —102 |
| $50 | Do. 5% 1st Mort. Debs., Red, 1929 | ... | 99 —102 |
| 1 | Shanghai Elec. Construction Co. | ... | 10½ — 11½ |
| 10 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 83 — 93 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | ⅝ — ¾ |
| 10 | Do. do. 4% Deb. Stk. | ... | 68 — 73 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 85½ — 87½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4⅞ — 5⅛ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 93 — 97 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. | ... | ¾ — ⅞ |
| 5 | Do. do. 6% Cum. Pref. | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock. Red. | ... | 81 — 86 |

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THE

# Tramway & Railway World

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## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

### CITY OF ABERDEEN.

TRAMWAY DEPARTMENT.

DOUBLE-DECK "PAY-AS-YOU-ENTER" CAR BODIES.

The Town Council of Aberdeen are prepared to receive tenders for Six Double-Deck "Pay-As-You-Enter" Car Bodies.

Drawings and specifications may be had from the undersigned on application at the Tramway Office, Municipal Buildings, Aberdeen.

Tenders, endorsed "Tender for Double-Deck Car Bodies," to be lodged at the Tramway Office, Municipal Buildings, not later than 12 o'clock noon on Friday, December 12, 1913.

The Town Council do not bind themselves to accept the lowest or any tender.

R. STUART PILCHER,
General Manager.

Corporation Tramway Office,
Municipal Buildings, Aberdeen,
December 1, 1913.

### CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery, and erection of Motor Converters or Rotary Converters and Static Transformers, as follows:—

Four 1,000/1,250 kw. Sets.
One 1,000 kw. Set.
Two 650/800 kw. Sets.

Specifications and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of two guineas, which amount will be refunded on receipt of a *bonâ-fide* tender.

Further particulars and information can be obtained from Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall, not later than 10 a.m., on Friday, December 19, 1913.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
December 1, 1913.

### CITY OF CARDIFF.

STEEL TRAM RAILS AND FISH-PLATES.

The Cardiff Corporation invite tenders for the manufacture, supply, and delivery of 500 Tons of Steel Grooved Girder Rails (British Standard Section Nos. 4 and 4C), and 23 Tons of Steel Fish-plates in accordance with specification and conditions, which, with form of tender, may be obtained at the office of Mr. W. Harpur, M.Inst.C.E., City Engineer, Cardiff.

Sealed tenders, endorsed "Tender for Tram Rails," are to be delivered at the Town Clerk's Office in the City Hall not later than Tuesday, December 16, 1913.

### COUNTY OF LONDON.

The London County Council invites tenders for the supply to the Tramways Department of (a) 10 Tons of Cotton-Covered Copper Wire and (b) Trolley Wire. Form of tender, etc., can be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

The contractor will be bound to pay to all workmen employed by him in and about the execution of the contract, or any part thereof, wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list and such rates of wages and hours of labour will be inserted in and form part of the contract by way of schedule. Particulars of the Council's Standing Orders on these matters are given in the *London County Council Gazette*. Tenders must be upon the official forms, and the instructions therein must be strictly complied with. No tender received after 11 a.m. on Tuesday, December 9, 1913, will be considered.

The Council does not bind itself to accept the lowest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

LAURENCE GOMME,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
December 3, 1913.

### WALTHAMSTOW URBAN DISTRICT COUNCIL.

TO UNIFORM CONTRACTORS.

The Walthamstow Urban District Council invite tenders for the supply of Uniforms for their Tramway Employees during the twelve months ending March 31, 1915.

Forms of tender and further particulars may be obtained from Mr. Wm. Murray, A.I.E.E., Tramways Manager to the Council, Tramway Offices, Chingford Road, Walthamstow, on and after Monday, the 8th day of December, 1913.

Sealed tenders, endorsed "Tender for Tramways Employees' Uniforms," to be delivered *by post only* to the undersigned not later than 5 o'clock p.m. on Tuesday, the 23rd day of December, 1913.

The Council do not bind themselves to accept the lowest or any tender, and reserve to themselves the right to accept the whole or any part of a tender.

The contractors will be required to pay the whole of their workmen such rates of wages and observe such hours of labour as are recognised by the various Trades Unions and in force at the time of signing the contract.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
December 2, 1913.

### CITY OF YORK CORPORATION.

ELECTRICITY AND TRAMWAYS DEPARTMENT.

CONTRACTS FOR 1914.

The Electricity and Tramways Committee of the York Corporation invite tenders for the supply of the undermentioned Stores and Materials between January 1, 1914, and December 31, 1915, viz.:—

Arc Lamp Carbons.
Carbon Brushes.
Electrical Accessories.
Incandescent Lamps (Carbon and Metallic Filaments).
Electric Meters and Time Switches.
Electric Motors and Motor Switches.
General Stores.
Engineering Stores.

General conditions and form of tenders may be obtained from the undersigned on application, and all tenders must be enclosed in sealed envelopes and delivered at the Electricity Offices, Clifford Street, York, not later than Monday, the 22nd of December.

J. W. HAME,
Engineer and Manager.

Electricity Offices, Clifford Street, York.

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## COUNTY BOROUGH OF BRIGHTON.

TO CONTRACTORS AND OTHERS.

The Council hereby invite tenders for the supply of 34,000 Jarrah Wood Blocks, and 700,000 Creosoted Deal Blocks of various sizes, and 500,000 feet lineal Creosoted Deal Splines.

The specification and form of tender may be obtained on application at the Office of the Borough Surveyor at the Town Hall, Brighton.

Sealed tenders, addressed to me, and endorsed "Tender for Wood Blocks," must be left at my office at the Town Hall before 10 o'clock in the forenoon on Friday, the 12th day of December, 1913.

The Council do not bind themselves to accept the lowest or any tender.

HUGO TALBOT,
Town Clerk.

Town Clerk's Office, Wigan,
November 29, 1913.

## BOROUGH OF LEIGH, LANCS.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply and erection of One Water-tube Boiler, complete with Mechanical Stoker, Forced Draught Plant, Air Heater, etc.

Full particulars and specification may be obtained from Mr. Arthur T. Smith, Borough Electrical Engineer, Leigh, Lancs.

All tenders must be delivered at the Town Hall, Leigh, Lancs., not later than 12 o'clock noon, December 19, 1913, endorsed "Tenders for Boiler," and addressed to the Chairman of the Electricity Committee.

W. H. COWBURN,
Town Clerk.

Town Hall, Leigh.

## COUNTY BOROUGH OF WIGAN.

TRAMWAYS DEPARTMENT.

The Corporation of Wigan invite tenders for the supply and delivery of the following :—

6 Double-Deck Tramcar Bodies with Top Covers.
6 Trucks.
6 Complete Electrical Equipments.

Copies of the specification, conditions, and forms of tender may be obtained from Mr. James Slevin, Tramways Engineer, Bradford Place, Wigan, on payment of £1 1s., which will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of 5s. per copy, which will not be refunded.

Sealed tenders, endorsed "Tenders for Tramcars," to be delivered to the undersigned on or before Monday, the 22nd instant.

The Corporation do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Town Hall, Brighton,
December 5, 1913.

*(Continued on page 481.)*

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27, CLEMENTS LANE, LONDON, E.C.
Telephone No.: 5735 CENTRAL.
Telegraphic Address: "INBRAKE," LONDON.

*British, Foreign and Colonial Representatives:—*

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 2?, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway and Railway World

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*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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SATURDAY, DECEMBER 6, 1913.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS.

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

## SUCCESS OF THE P.A.Y.E. SYSTEM IN ABERDEEN.

The report by Mr. R. S. Pilcher, general manager of Aberdeen Corporation Tramways, on the results of five months' experience with pay-as-you-enter cars, is one of the most important testimonies yet given in this country to the value of the system. The outcome of Mr. Pilcher's experience with eleven pay-as-you-enter cars has been so satisfactory that he recommends the Corporation to adopt cars of this kind for their whole tramway system. The Town Council, following a proposal by the Tramways Committee, have decided as a step in that direction that six new cars about to be ordered shall have bodies of the pay-as-you-enter type. It will be remembered that Leicester Corporation recently, also in the light of experience, ordered that ten new cars about to be obtained should also be so constructed that the P.A.Y.E. method can be used. In view of the anticipated difficulty with the method in this country in the shape of delay on busy routes, it is specially interesting to note the Aberdeen experience. The feeling has existed in many quarters that on busy routes, with graded fares and top-deck cars, worse time would be made owing to delay in loading. But in Aberdeen the reverse has been the case. It is true that the traffic in Aberdeen cannot be compared with that, say, in Glasgow or Manchester, but still it is very considerable. Moreover, it appears that it has been at the busiest times, such as during agricultural show traffic, that the pay-as-you-enter cars have specially shown themselves able to cope with everything that was going and to keep time, while the other cars were late. Further, the pay-as-you-enter cars have been run on the Woodside route, which is the busiest in the city. The public have willingly responded to the request to have their money ready before entering the cars. The amount of change to be given has greatly diminished. It is admitted that loading at a busy terminus takes slightly longer than in the case of ordinary cars; but the pay-as-you-enter vehicles save time at every stopping place. Records taken on two busy days showed that on the average the ordinary car took 35 minutes for a certain journey, while the pay-as-you-enter took a minute less. Yet the latter carried one more passenger per car-mile and earned nearly a penny more per car-mile. Another point made is the reduction in the number of accidents arising from passengers leaving cars in motion. Then there is the increase in receipts owing to all fares being collected and to the fact that the conductor can keep a better lookout for passengers, and this increase is not merely in total receipts per car but per car-mile, in spite of the fact that a greater mileage was run. It appears that in Aberdeen the cost of altering a roof-covered car for the pay-as-you-enter system is about £30, and for an open-top car considerably less. No doubt the figure would vary somewhat in different towns according to the style of car at present in use, but the Aberdeen quotation gives an idea of the cost, which may be of general utility. Tramway managers throughout the country will await with interest further reports from the towns which have adopted the system, and particularly as to the question whether on busy routes, in any case, average car speed is reduced or not. The point at present is that so far as experience has gone those engaged in working cars on this method are its strong supporters.

## ELECTRIC TRACTION LEGISLATION.

The following additions to the list of proposals for Bills in next session of Parliament, published in our issues of November 22 and 29, brings the total number of electric traction and motor omnibus Bills up to 31.

METROPOLITAN AND GREAT NORTHERN RAILWAY COMPANIES.—This Bill, which is promoted jointly by the Metropolitan and Great Northern Companies, seeks to constitute and incorporate a Joint Committee of directors of the two companies, to constitute the Joint Committee a railway company; to provide for the leasing to the Joint Committee by the Metropolitan Company of the undertaking of the Great Northern and City Railway Company, which was vested in the Metropolitan Company by their Act of 1913; to vest in the Joint Committee powers of the Act of 1913 to construct an extension railway in the City of London, to provide for the construction and maintenance by the Joint Committee of the above railway and also other railways proposed in the Bill, and to enable the two companies to raise additional capital. Solicitors—C. de W. Kitcat, 32, Westbourne Terrace, Paddington; R. Hill Dawe, 1, The Abbey Garden, Westminster. Parliamentary agents—W. and W. M. Bell, 3a, Dean's Yard, Westminster; Dyson and Co., Caxton House, Westminster.

A NEW PROCEDURE.—Special interest attaches to a notice, published since our last list of Bills was printed, of an application to be made to the Board of Trade for a Provisional Order to authorise extensions of already authorised trackless trolley routes. It has been the custom when promoters have brought Bills before Parliament to enable them to instal and work the trackless trolley system on specified routes to seek powers for the Board of Trade to authorise future extensions by means of Provisional Orders. Procedure by Provisional Order is, of course, cheaper and more convenient than procedure by private Bill. Hitherto, however, no applications have been made to the Board of Trade for the purpose, but in the coming session one private Bill at least (among other objects which it contains) seeks authority for trackless trolley extensions. Now, however, the Western Valleys (Monmouthshire) Railless Electric Traction Company are applying to the Board of Trade for a Provisional Order to extend the trackless trolley system which was authorised by the company's Act of 1913. The following is an abstract of the notice.—Application by the company to the Board of Trade for a Provisional Order, pursuant to sections 28 and 55 of the Western Valleys (Monmouthshire) Railless Electric Traction Act, 1913, to authorise the company to provide and use trackless trolley vehicles on three additional specified routes in Abertillery; to incorporate with the Order such provisions of the Tramways Act, 1870, and of the Act of 1913 as may be deemed expedient for erecting and maintaining trolley vehicle equipment, breaking up streets, charges for passengers, use of electrical power, etc.; and to authorise the company to raise additional capital. Parliamentary agents—R. W. Cooper and Sons, 5, Victoria Street, Westminster.

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## P.A.Y.E. CARS AT ABERDEEN.

THE MANAGER RECOMMENDS THEIR USE ON ENTIRE SYSTEM.

Mr. R. Stuart Pilcher, the general manager, Aberdeen Corporation tramways, has submitted to the Tramways Committee a report on the working of the Pay-As-You-Enter cars, which were introduced into Aberdeen on April 28 last. Mr. Pilcher, who recommends the adoption of the P.A.Y.E. type of car over the whole system, points out in his report that the public have responded very willingly to the request that they should have the fares ready on entering the cars. There had been a certain amount of criticism, which was only to be expected with any new system, but that criticism had been directed more to the details of the car, which could be remedied, than against the general principle of the P.A.Y.E. system. With regard to the loading of cars at a busy terminus or for any special event, the P.A.Y.E. cars no doubt took slightly longer to load, but those cars would save time at every stopping-place en route. The average running per journey on a certain afternoon showed a saving of nearly a minute in favour of the P.A.Y.E. cars, while there was an increase in the number of passengers per car mile of about one, and an increase in the receipts per car mile of .8od.

The prepayment of fares had a direct influence on the finances. Any person who studied the conditions of the present-day tramway traffic must prove to himself that a conductor—no matter how conscientious he might be—could not collect all the fares and attend to his other numerous duties. A great deal of the extra revenue was due to the prepayment of fares, and to the fact that the conductor was in a better position to see all intending passengers.

Mr. Pilcher states that during the past five months he has given close personal observation to the Pay-As-You-Enter cars. These cars have had to deal with the Agricultural Show traffic, on which day the ordinary cars were, in some cases, too crowded for the conductor to collect all the fares, whereas the Pay-As-You-Enter cars required no checking; and on another occasion—that of the "Timmer Market"—thousands of children were carried without any delay, whereas the cars on other routes were, in many cases, running late. He had no hesitation in recommending the Pay-As-You-Enter cars to the committee as an improved method of tramway operation by which greater public safety can be obtained. The number of Pay-As-You-Enter cars in operation on the Woodside route at present was 11, leaving 47 top-covered cars of the ordinary type. The cost of altering this type of car would be £30 each; the cost of altering the open cars would be considerably less than this.

The Town Council on December 1 adopted a recommendation by the Tramways Committee that, in the meantime, the general manager should be authorised to invite tenders for bodies of the Pay-As-You-Enter type for the six new cars recently sanctioned. It was also decided that the report by the general manager should be forwarded to the Board of Trade, and application made for the sanction of the Board to the permanent use of the Pay-As-You-Enter cars.

THE ROYALTIES ON PREPAYMENT CARS.

In reporting on the proceedings of the Municipal Tramways Conference the manager of Lowestoft tramways referred to the discussion on prepayment cars. The secretary of the International P.A.Y.E. Tramcar Company has written to the local newspapers correcting the statement as to the royalties to be paid. He says:—"The report states that the cost of altering the cars is between £30 and £40 each, and the royalties amount to £20 a year. This latter statement is a distinct error. The royalty of £20 is that of a sum paid once down for the life of the car, and as the life of a tramcar is anything from 10 to 15 years, or even more, you will see that the royalty per year works out at less than £2 per annum, and the royalties for all of the cars in Lowestoft, instead of being £380 per annum, would be less than £38 per year."

## BELFAST PROFIT-SHARING SCHEME.

The Secretary of the Irish Local Government Board forwarded the following communication to a meeting of Belfast Corporation held on December 1:—"The Local Government Board for Ireland have had under consideration the appeal to them, from the persons aggrieved, against the surcharge of £2,800, in respect of 'salaries and wages' paid to the members of the staff of the Belfast City Tramways, which was made by the auditor at the audit of the accounts of the City and County Borough of Belfast for the year ended March 31 last. The Board have given careful consideration to the views and contentions put forward by the appellants, and to the legal opinions quoted in their statements, and have taken further legal advice; and they have found that the surcharge was lawfully made. While, however, the Board are clearly of opinion that the scheme put into operation for making the tramway employees participants in the profits of that undertaking was not within the legal powers of the Belfast Corporation, they have found that the subject matter of the surcharge was made in such circumstances as to make remission fair and equitable, and have given directions for the preparation of the order accordingly, copies of which will be forwarded in due course to the Corporation."

**Tramway Siding for Works Employees.**—A tramway siding into the works of Courtauld and Co. has been constructed from the Coventry tramways. Its use will obviate the congestion and the delay hitherto caused while cars have been loaded and unloaded with the employees in Foleshill Road.

## L.C.C. TRAMWAY MATTERS.

EXCESS COST IN TRAMWAY CONSTRUCTION.

At last Tuesday's meeting of the London County Council the Highways Committee reported that for the construction of tramways in Tooley Street the total expenditure had amounted to £7,796, being £746 more than the estimate approved by the Council. The increase was chiefly due to the fact that the sum of £1,100 which the Council had to pay to Bermondsey Borough Council in respect of the removal of an underground convenience was £500 in excess of that provided for in the estimate. The remainder was due to the increased cost in regard to carrying out alterations to mains at night time in order to avoid interfering with the heavy traffic through Tooley Street. In the case of the tramways from Norton Folgate to near Liverpool Street, the trackwork had been constructed well within the sum provided in the estimate of £12,590. The cost of the alterations to mains, however, exceed the sum provided in the estimate, and the total cost of construcion, including alterations of mains, had amounted to £18,640. The additional expenditure on the mains (some £6,300) arose to a large extent from the requirements of the City Corporation that all the mains should be relaid in one trench, and that the work should be carried on continuously by day and night. The committee recommended the sanction of supplemental estimates to cover the increased cost.

The Finance Committee pointed out that the addition of £6,500 to the estimated cost of the tramways from Norton Folgate to near Liverpool Street was equal to over 50 per cent. of the sum originally estimated, and it would involve an additional charge on the tramway revenue of £520 in the first year for interest and repayment of debt. The Finance Committee had suggested to the Highways Committee that before the estimates for the construction of tramways were put forward some arrangements should be arrived at as to the manner in which the alterations to mains were to be carried out.

Consideration of this report was adjourned.

ABBEY WOOD CAR SHED.

Ten tenders had been received from selected firms for the erection of the completion of Abbey Wood car shed. The tenders varied in amount from £16,981 to £20,000, and the architect's estimate was £17,900. The Committee recommended that the lowest tender, that of Rowley Bros., Wood Green, amounting to £16,981, should be accepted. The cost of erection, including incidental expenses, was estimated at £18,900, but this amount did not include the cost of paving, trackwork, lighting, etc., while it was also proposed to instal hydraulic pit jacks and a traverser at the car shed. The Committee would report on those works as soon as possible, and meantime they asked approval for an estimate of £18,900. The whole car shed when completed would provide accommodation for 80 cars, comprising 25 in the first section and 61 in the part now proposed to be dealt with. The recommendation was adopted.

THROUGH RUNNING AND RETURN FARES.

A through service of cars between Holborn and North Finchley, arranged with the Metropolitan Electric Tramways, Limited, was, the Committee reported, commenced on November 23.

COTTON-COVERED COPPER WIRE.

The undermentioned tenders were received from selected firms for the supply of (a) one ton of T.C.C. copper wire .229 inch diameter, and (b) 1½ tons of D.C.C. copper wire .229 inch by .229 inch required in connection with winding car field coils.

| | Prices a ton. A. | Prices a ton. B. | Discount. Per cent. |
|---|---|---|---|
| Siemens Brothers and Co. .. .. | £ 96 5 0 | £ 80 6 8 | — |
| British Insulated and Helsby Cables | 93 6 8 | 91 0 0 | 2½ |
| Midland Electric Wire Co. .. .. | 93 6 8 | 93 6 8 | 2½ |
| London Electric Wire Co. & Smith's, Ltd. | 91 0 0 | 93 6 8 | 2½ |
| India Rubber, Gutta Percha and Telegraph Works Co. .. .. .. | 99 17 8 | 100 17 6 | 2½ |
| Johnson and Phillips .. .. .. | 98 0 0 | 101 0 0 | — |
| Henley's Telegraph Works Co. .. | 105 0 0 | 101 10 0 | 2½ |
| General Electric Co. .. .. .. | 105 0 0 | 102 13 4 | 2½ |
| Callender's Cable and Construction Co. | 110 0 0 | 112 0 0 | 2½ |
| Western Electric Co. .. .. .. | 110 0 0 | 112 0 0 | 2½ |

The Committee had accepted the tender of the British Insulated and Helsby Cables amounting to £224 1s. 9d. The estimate of the chief officer was £245. The action taken was approved.

PETROL-ELECTRIC CARS.

A discussion took place on the adjourned report of the Highways Committee regarding the experiment which has been made with petrol-electric cars. This report stated that a service of petrol-electric cars (which were horse cars converted and equipped) had been run between Tooley Street and Greenwich Church, in order that an idea might be gained of the cost of running, etc. The result had convinced the Committee that the Burdett Road and Grove Road route (where it was proposed to use this system of traction) was not suitable for working by petrol-electric cars.

Mr. G. A. Dutfield said he wanted to know how long the experiment lasted, whether it was an exhaustive test, and why the Committee had come to the conclusion that this particular route was not suitable for petrol-electric cars. Residents in the neighbourhood were anxious to get tramcar facilities, and not long ago the Stepney Borough Council were invited to inspect the petrol-electric system in company with members of the London County Council. Although he was not present on that occasion, he believed it was considered that the system was suitable to the needs of the

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district. He moved that the report of the Committee be not received, on the ground that insufficient information was given to the Council.

Mr. G. H. Hume (vice-chairman of the Committee) expressed regret that the report of his Committee should have been considered meagre. There was no desire to hide the facts in connection with the experiments which the Council had undertaken. Those experiments were commenced on July 10 last, and had been continued without a break since that date, and the cars were still being run. The real reason why the Committee could not recommend the adoption of the system was that the cost per car mile of running the petrol-electric motors was so much higher than that of the Council's present electric tramcars, and it would be actually cheaper to run a service on the conduit system. It was, of course, possible that, in the course of time, there would be a considerable improvement in the petrol-electric car, but at the present time, reckoning the cost of petrol at 1s. 2½d. per gallon, it was estimated that the cost per car mile of running would be 8.319d., whereas the actual cost per car mile for the year 1912-13 of the Council's present electric tramcars only amounted to 6.62d.

Mr. Dutfield then withdrew his motion, and the report of the Committee was formally received.

## TRAMWAY CHAIRMEN FOR 1913-14.

The following list of chairmen and vice-chairmen of the various Tramway Committees for the ensuing year is continued from previous issues :—

| Town. | Chairman. | Vice-Chairman. |
|---|---|---|
| Aberdare .. .. | Councillor E. M. Hann .. | ——— |
| East Ham .. | *Councillor T. H. Cowper .. | ——— |
| Great Yarmouth .. | Alderman C. A. Campling .. | Councillor J. T. C. Salmon. |
| Ilkeston .. .. | *Alderman S. Shaw .. .. | *Alderman W. Tatham. |
| Middlesex C.C. .. | Alderman H. Burt .. .. | *Councillor F. Goodyear. |
| Oldham .. .. | Alderman F. G. Isherwood .. | Councillor F. Elliot. |
| Oxford .. .. | *Alderman E. J. Brooks .. | Alderman F. W. Ansell. |
| Southend .. .. | Alderman A. Martin .. .. | ——— |
| Southport .. .. | *Councillor T. S. Richardson .. | ——— |
| Stalybridge .. | *Alderman R. Wood .. .. | *Alderman Wm. Lee. |
| West Hartlepool .. | Councillor Martin .. .. | Councillor Charlton. |

* Denotes a change in the chairmanship or vice-chairmanship.

## MISCELLANEOUS NEWS AND NOTES.

**New Workshops for Wallasey.**—The Tramways Committee have taken over land in Seaview Road as a site for new workshops.

**Lincoln and Sunday Running.**—By 15 votes to five the City Council have rejected a motion in favour of the running of the tramway service on Sundays.

**Heavy Fine for Obstruction.**—A driver of a motor lorry, summoned at East Ham for obstructing a Corporation tramcar for a distance of 800 yards, was fined £3 and costs.

**Councillors and Free Passes.**—By the casting vote of the Mayor, the Brighton Corporation have rejected a proposal of a councillor that free passes on the tramcars should be granted to members of the Council.

**Explosions from the Use of Bitumen.**—The Board of Trade have appointed a committee to consider the causes of explosions which have occurred in connection with the use of bitumen in laying electric cables, and to report as to any steps which should be taken to prevent explosions in future from the use of bitumen or similar substances.

**Tramway Insurance.**—Replying to statements that the tramways undertaking was not sufficiently insured, Alderman Meyer, chairman of the York Tramways Committee, has pointed out that there was a very heavy insurance of the employees up to £90,500. There was a third party risk of £5,000, and the cars and car shed were insured very heavily.

**Mumbles Railway Electrification.**—It is understood that the scheme for the electrification of the railway between Swansea and the Mumbles will involve an expenditure of over £50,000. Mr. C. W. G. Little, chief electrical engineer of the British Electrical Federation, Limited, is advising the Swansea Tramways Company in the matter.

**Gateshead Tramway Company's Omnibus Services.**—The motor omnibus service recently instituted between Scotswood, Blaydon, and Swalwell was extended to Dunstan on November 3. For the whole distance the fare is 5d. An application to the Newcastle Tramways Committee for permission to run motor 'buses over the Scotswood Bridge has not been entertained.

**New Cars and Plant for Northampton.**—Since 1906 the passengers and receipts on the Corporation tramways have increased by 50 per cent., and the Tramways Committee on December 3 were authorised to enter into contracts for the supply of four new top-covered vestibule cars at £2,600, for the extension of the car sheds and stores at £2,400, and for additional generating plant at £4,400.

**Device to Register Upper Deck Passengers.**—Sheffield Tramways Committee are considering the desirability of adopting on all their cars a passenger-registering device patented by Messrs. Singleton and Priestman, of Sheffield. It has been given an extended trial by the department, with highly satisfactory results. The apparatus is attached to two of the steps of the staircase to indicate an ascent or descent, and the numbers are recorded on a dial, which can be seen on the platform by the conductor and intending passengers.

**Traffic Inducement at Blackpool.**—Four more transparent maps of the tramways system are to be fixed in prominent positions. At night the maps can be illuminated. Last season the Corporation tramways manager had a similar map placed in the vicinity of Talbot Square for the convenience of visitors, showing all the principal places of entertainment and public buildings. In order to further popularise the cars, the committee have ordered another 100,000 pocket maps of the tramway system for public distribution next season. Three more top covers are to be obtained for the Marton cars, bringing the total of this class of car to 25, of which 12 will be in use on the Marton route during the winter.

**Opening of the Buenos Ayres Tramways Subway.**—The underground line of the Anglo-Argentine Tramways Company in the centre of Buenos Ayres between Plaza Mayo and Plaza Once, the first line of its kind in South America, was inaugurated on December 2 by the President of the Republic. The line had been running for five days without a hitch, and for that time the company had admitted the public on free tickets. The trains travel perfectly with great speed. The staff is well trained, the rolling stock is luxurious, the stations are brilliantly lighted, with a large amount of daylight. The opinion of experts is that the new service will be a very successful one. The double line connects with the Buenos Ayres Western Railway terminus, and is over two miles long.

**Litigation Over London Tramway Assessment.**—In the King's Bench Division on December 2 the Islington Assessment Committee endeavoured to show cause against a rule for a mandamus granted in July last ordering the committee to appoint a person to make a provisional valuation list with a view to inserting a portion of the London County Council tramways in the borough at a reduced assessment in consequence of a reduction in profits, owing to motor omnibus competition. Counsel said that in order to justify a reduction in the assessment it must be shown that the reduction was substantial, continuous, and permanent. Mr. Justice Bray, in giving judgment, said that in his opinion sufficient continuity of decrease of profits had been shown. It was also clear that the Assessment Committee had gone wrong on a matter of law. The Court made the rule absolute for peremptory mandamus, with costs. Mr. Charles applied to have the operation of the mandamus stayed, pending an appeal. Mr. Justice Bray replied that if the Court of Appeal thought the Assessment Committee should have a little time they would grant it.

**Third-Party Insurance.**—Allusion was made by a shareholder at the annual meeting of the Provincial Tramways Company to the setting aside of £2,000 for third-party insurance. Mr. J. Barber Glenn, the secretary, stated that this was the first time the company had set aside money for third-party insurance. It had been the practice of the company and also of the Isle of Thanet Tramways Company, with which he was connected, to insure in an office, and the payments were very considerable. In the Isle of Thanet Company at one time it was a very disastrous transaction for the insurance company; the Provincial Tramways had always been a very good risk. Accidents were always a very uncertain factor, and the last people that insured them at Gosport had not paid a single sixpence during the year until within a fortnight of the end of the 12 months, when a control wire got adrift and injured a woman, who recovered £550 damages and £170 costs. The directors had made a start towards insuring their own risks by setting aside £2,000. They were insured with an office up till next September, and possibly, when they had got the fund up to £4,000 or £5,000, they might safely do their own insurance altogether. It was entirely a question of policy.

**Singular Claim by a Motorman.**—A compensation claim brought against the Salford Corporation tramways department by a motorman, named Samuel Glynne, was heard at Salford County Court

**List of Applications made to the Light Railway Commissioners in November, 1913, for Light Railway Orders.**

| Title. | County. | Promoters. | Engineers. | Mileage. | Motive Power. | Gauge. ft. | Gauge. in. | Agents. |
|---|---|---|---|---|---|---|---|---|
| Dearne Valley .. .. | Yorks, W.R. .. | Wombwell, Wath-upon-Dearne, Bolton-upon-Dearne and Thurnscoe Urban District Councils .. .. .. | S. Sellon .. .. | 18¼ | Electric .. | 4 | 8½ | Butterworth and Co. |
| Hutton Magna .. .. | Yorks, N.R. .. | William Spencer .. .. .. | S. W. Meyer .. | 3¼ | Steam .. | 4 | 8½ | Spencer Clarkson and Co. (Keighley). |
| York Corporation (Extensions) | York City .. | Corporation of York .. .. .. | F. W. Spurr<br>J. W. Hame | 1¼ | Electric .. | 3 | 6 | Sharpe and Co. |
| Mid-Flintshire (Greenfield Harbour Extensions) .. | Flintshire .. | Mid-Flintshire Light Railways Co., Ltd. | W. F. Butler .. | ¾ | Steam .. | 4 | 8½ | Chamberlain, Johnson and Levy. |

Total Mileage proposed—24 miles at an estimated cost (including equipment, rolling stock, and all other charges of £247,795.

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on December 1. Applicant, a motorman, contended that owing to the hand brakes being defective on the car which he drove on February 26-29 he suffered severe nervous strain. He narrowly escaped running down a man. Either the shock of this incident or the nervous strain and tension throughout the days he was in charge of the car constituted, he submitted, an accident within the meaning of the Act. He was taken eventually to the Lancaster County Asylum for a time. Claimant said he made a report on the brakes on two occasions, and once he took the car back to the depôt. Another motorman gave evidence that when the brakes were turned a certain distance "no white man could shove them any further." Mr. Jackson, for the defence, said the brake in question was of the ordinary type which had been used for many years by Salford and other Corporations. An easier brake, the Peacock, had now been introduced, and Car 95, which was in perfect order, was the last to be dealt with. Dr. Austin, medical superintendent of Hope Hospital, said that Glynn was entirely irresponsible when he was sent there. The sudden strain of nearly having an accident might have accentuated an attack of mania. Mr. Wm. Holford, general manager of the Salford tramways, said every care was taken to see the brakes in the cars were thoroughly overhauled and examined. In the case of reports on brakes such as the applicant in this case made with regard to Car 95, the forms were collected and a gang of men every night saw to the remedying of any defects, if such were found. Officials who examined Car 95 after Glynn's reports said nothing wrong was found. Two drivers who had had experience of No. 95 about the time the applicant was driving it said they found nothing defective in the brakes. Judge Stanger said that he was satisfied that the accusations against the management of the tramways as to the neglect of reports about defective brakes were not justified. It was not the fact that the brakes were defective as alleged. He held, further, that the applicant's attack of mania was not the result of the occurrence described by him—the narrow escape from running over an old man. His Honour therefore found for the Corporation, at the same time expressing sympathy with the applicant.

## CONTRACTS AND ORDERS.

**Leyland Motors, Limited,** have received a contract for the supply of a motor tower wagon to Accrington tramways, at £610.

**Tudor Accumulator Company, Limited,** have received a contract from Salford Council to weld 600 tramway rail joints at 30s. per joint.

**Rotherham Tramways Committee** have placed a repeat order with E. Bennis and Co., Limited, for two machine-stokers and self-cleaning compressed-air furnaces for a Lancashire boiler.

**J. Eaves and Company** have received a contract to construct a transformer chamber at the island platform near the Blackpool Hippodrome for the tramways and electricity department, at £355.

**Peckham Pendulum Trucks.**—Contracts have been awarded recently to the Brush Electrical Engineering Company, Limited, for 15 Peckham pendulum trucks for Bexley Heath tramways and 5 for South Shields Corporation tramways.

**Bournemouth Council** have allotted contracts as subjoined:—United Electric Car Company, car bodies and vestibules; Brush Electrical Engineering Company, trucks (Brill type); British Westinghouse Electric and Manufacturing Company, Limited, electrical equipment, £343, and brakes, £150.

**Hailey's Industrial Motors, Limited,** have received an order from the Borough of Leith tramway department for a 25 h.p tramway tower wagon. The company have also received an order from the Glasgow Corporation tramway department for two of these tower wagons, which will likewise be of 25 h.p. capacity.

**South Lancashire Tramways.**—The chief contractors for the new turbine which has been installed in the generating station of the South Lancashire Tramways Company at Howe Bridge were Messrs. Brown, Boveri for the generator, Messrs. Howden for the turbine, and the Rees Roturbo Company for condensing plant.

**London County Council** have accepted tenders as follow:—Rowley Brothers, Wood Green, erection of completion of Abbey Wood car shed, £16,081; British Insulated and Helsby Cables, one ton of T.C.C. copper wire .220in. diameter, and 1½ tons of D.C.C. copper wire .220in., for winding field coils, £224 1s. 9d., less 2½ per cent. discount.

**Warrington Council** have placed the following contracts for extensions of buildings and plant at the electricity works:—Buildings, J. Dolan and Son, £2,738; boiler plant, Babcock and Wilcox, Limited, £2,362; turbo-alternator plant, J. Howden and Co., Limited, £5,843; condenser plant, Worthington Pump Company, Limited, £3,344; economiser plant, Goodbrand and Co., Limited, £203 10s.

**The Simplex Rubber Company, Limited,** of Scrubbs Lane, Willesden Junction, have supplied "Simplex" rubber tyres to the Inter-Transport Company for their 5-ton "Berna" lorries, which are working successfully in London and the provinces, particularly in Lancashire. Within the last few days the Simplex Company have fitted tyres to three more Berna lorries for this company, making a total of seventeen lorries running on "Simplex" solid rubber tyres.

**Perth Contracts.**—In connection with the erection of a power house and plant for the Perth (Western Australia) tramways and lighting and the electrification of some of the railway sections, it is reported that four contracts have been let for a total of £188,521 with Babcock and Wilcox, Limited, Willans and Robinson, Limited, and the British Westinghouse Company, and that tenders have been called in London for three others, estimated at about £85,000. All the works are to be completed by June, 1914.

**Omnibuses for Liverpool.**—Orders have been placed by the City Council with W. A. Stevens, Limited, the Brush Electrical Engineering Company, Limited, and Straker and Squire, Limited, for the supply of two motor omnibuses each.

## PERSONAL.

**Mr. W. H. Oldfield,** of Chelstow, has been presented with a framed photograph of the staff and employees of Torquay Tramways Company "in affectionate appreciation of his kindly interest in them."

**Mr. Thomson,** the engineer-in chief to the Government of Western Australia, according to an Australian journal, dated October 23, was then in England preparing a report in connection with the electrification of some of the railways in Western Australia.

**Mr. Charles Corner,** M.Inst.C.E., M.Am.Soc.C.E., chief engineer, Beira and Mashonaland and Rhodesia Railways, Bulawayo, proceeds on extended leave at the end of November, 1913, prior to retirement, after fifteen years' service. During this period Mr. Corner acted as general manager in 1909 and again in 1913.

**Alderman D. L. Winter,** the Rotherham Tramways Committee reported to the Council on December 3, had been re-elected Chairman of the Committee. Mr. Caine moved that the report be referred back to the Committee. The Town Clerk ruled that the standing orders gave each committee absolute right to elect their chairman, but it was competent for the Council to refer a minute back. Councillor Caine stated that the Council had decided to double the Fitzwilliam Road track. At the committee meeting the chairman announced through the Town Clerk that it was his intention to ask for a Board of Trade inquiry, and that he was doing so as a private individual and a ratepayer. It was impossible, he thought, for Alderman Winter to disassociate himself from the chairmanship unless he resigned his position. The motion was not seconded.

**Mr. R. S. Tresilian,** secretary of the Dublin United tramways, has just returned to Dublin after a month's tour on the Continent in the course of which he visited Brussels, Paris, Berlin, Vienna, Budapest, Athens, Smyrna, and Constantinople. Much attention was devoted to tramway systems both ancient and modern, ranging from one horse single-deck cars to the latest installation of overhead electric traction of which Constantinople now boasts an example. Mr. Tresilian travelled through the scenes of the late war in the Balkans, and found many of the districts in a truly distressing condition from which a recovery can only be expected after the lapse of many months. Unfortunately for commerce and industry the principal attention of the people concerned seems to be concentrated on an early effort to renew the struggle which has already proved so disastrous to them. At present, however, the want of money ensures peace.

**Mr. Charles Furness** on December 2, by 22 votes to 20, received from Blackpool Council the increase of £200 recommended by the Tramways and Electricity Committee in his salary as tramways manager and electrical engineer. His total remuneration will thus be £900 per annum. Alderman Brodie, chairman of the committee, in moving the minutes, said that Mr. Furness's work warranted the increase. He was appointed electrical engineer twelve years ago at £520 per annum, which was later increased to £600. On the death of Mr. Lancaster, the late tramways manager, four years ago, Mr. Furness was appointed to that position, practically as an experiment, with another £100 per annum. At that time the profits were £8,000 per annum. The following year the profits were £10,000, in March last £18,300, and it was estimated that for the present year they would be £25,000. The electricity profits had been as low as £58 and as high as £8,000, and this year the profit would be £7,000. Mr. Furness had brought about a general saving in the consumption of coal. When he came they were using 15,000 tons compared with 12,000 to-day, and as the price had been considerably increased the saving was very considerable. In addition to that the current had been doubled in quantity.

**Mr. Christer P. Sandberg** died at an advanced age on December 4 at 4, Crystal Palace Parade, Upper Norwood. He was the author of the specification of the Silicon steel rail, and was one of the oldest members of the Institution of Civil Engineers.

## FINANCIAL REPORTS AND MEETINGS.

**Brazilian Traction, Light and Power Company.**—The directors have declared a dividend of 1½ per cent. for the three months ending December 31, 1913, on the 6 per cent. cumulative preference shares.

**Scarborough Central Tramway Company.**—At the annual meeting on November 26 the chairman (Mr. J. Pirie) said that in recommending a dividend of 4s. per £5 share (6d. more than last year) the directors had gone on safe lines, as they could have paid more. £100 was added to the reserve fund, and £75 carried forward.

**Six Months' Increase of Traffic at Glasgow.**—For the first half of the financial year ended November 30, the tramways traffic receipts amounted to £520,677, as compared with £492,054 in the corresponding period of the preceding year, an increase of £37,623. The number of passengers carried was 164,000,000, as compared with 150,000,000 in the corresponding period of the previous year.

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**Burmah Electric Tramways and Lighting Company.**—A dividend of 3 per cent. (3s. per share) is announced on the preference shares, placing £5,000 to reserve for depreciation and carrying £908 forward. The directors report that there is no prospect of paying off the arrears on the preference shares. They therefore recommend that they be cancelled, that the dividends be increased from 6 to 7 per cent. per annum, and that they be non-cumulative.

**The British Electrical Federation.**—The traffic statement for the week ended November 28, 1913, shows that the receipts from tramways and railways amounted to £37,676, as compared with £35,031 in the corresponding week last year, and from omnibuses £12,155, as compared with £1,333, making a total of £49,831, as compared with £37,264. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show an increase of £1,679 upon the week.

**L.C.C. Traffic Receipts Still Improving.**—The traffic return of the L.C.C. tramways for the week ended November 19 showed that the number of passengers was 10,143,622, against 9,539,234 in the corresponding week of last year. The receipts were £42,565, against £40,248, being an increase of no less than £2,317. What is even more interesting is that the aggregate for the financial year so far as it has gone now shows for the first time an increase compared with the corresponding period of last year. Owing to the heavy decreases in the early part of the financial year the aggregate up till now has shown a decrease. The receipts from April 1 to November 19 amounted to £1,406,435, against £1,405,305, being an increase of £1,130.

**Allowance for Renewals as Part of a Deficit.**—Bexley Council have received from the accountant a report on the results of working the tramways and electricity undertakings. The tramways showed a deficiency of £383, and the electricity undertaking a surplus of £99. The amount provided in the rate estimates for the trading undertakings was £286. In arriving at the deficiency the sum of £242 had been charged to tramways revenue as a first contribution to a fund created for the purpose of wholly or partially meeting the cost of future renewals in accordance with the Council's resolution. The Council have adopted a recommendation that the accountant be authorised to charge the amount of the tramways deficiency to the district fund for the year 1912-13.

**Result of Petrol Car Traction at Morecambe.**—Mr. W. H. Pickles, the chairman of the Morecambe Tramways Company, in moving the adoption of the report at the annual meeting on November 29, said there was an increase in receipts of £649. The cars had travelled 52,005 miles, an increase of 14,777, and the number of passengers had been 424,136, an increase of 105,259. The receipts per car mile had been 13.10d., a decrease of 1.7d. per mile as compared with the previous year. The total working expenses had been 8.12d. per car mile, as compared with 9.6d. the previous year. The report was adopted, and a dividend of 3 per cent. was declared, as against 2½ per cent. last year. The secretary (Mr. Petty), replying to a vote of thanks, said that petrol had been the salvation of the company, which would have gone into bankruptcy but for the decision of the directors to adopt petrol-driven tramcars, the first of their kind in England.

(*Continued from page* 476.)

## POSITIONS VACANT.

### ILFORD URBAN DISTRICT COUNCIL.

TRAMWAYS DEPARTMENT

CHIEF INSPECTOR.

The above Council invites applications for the position of Chief Inspector on their tramways.

Salary, £3 per week.

All applicants for this position must have had previous training as Tramway Inspectors, and preference will be given to those with experience as Tramway Inspectors in the Metropolitan police area.

Particulars of duties, etc., may be had on application to Mr. L. E. Harvey, A.M.I.E.E., Tramway Offices, Ley Street, Ilford, to whom all applications should be addressed by December 20, endorsed "Chief Inspector."

By order, ADAM PARTINGTON,
Clerk of the Council.

Town Hall, Ilford,
December 3, 1913.

### MAINS FOREMAN.

Applications are invited for position of Mains Foreman as Assistant to Line Engineer. Must have good experience of Tramway Cable-work, including Fault-testing. Three years' agreement, salary commencing at £200 per annum, payable in local currency; free quarters. Applications, by letter only, with copies of testimonials, to be sent to the Secretary, Shanghai Electric Construction Company, Limited, Basildon House, Moorgate Street, London, E.C.

### DEPOT AND TICKET CLERK.

Wanted, capable man, used to ticket office and depôt inspector's work. Apply Gateshead Tramways Motor Service, Picktree Lane, Chester-le-Street, Co. Durham.

**DICK, KERR & CO.,**
**Limited,**
**ABCHURCH YARD, CANNON STREET,**
**LONDON, E.C.**
**ENGINEERS & CONTRACTORS.**

**Complete Equipment**
**TRAMWAYS & LIGHT RAILWAYS**
**at home and abroad.**

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended November 29 amounted to £221,342, or £14,801 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £77 6s. 9d. per track mile, an increase of £3 1s. 11d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

December 5, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, December 5. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 65 10 0 .. | 65 15 0 .. | 75 10 0 |
| ,, ,, (three months) .. .. | 64 5 0 .. | 65 5 0 .. | 76 5 0 |
| Electrolytic Copper—bars or ingots | 68 10 0 .. | 69 5 0 .. | 81 10 0 |
| Aluminium—bars or ingots .. .. | 83 0 0 .. | 83 0 0 .. | 86 12 0 |

## COAL MARKET.

December 5, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, December 5. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 26 0 .. | 25 6 .. | 24 0 .. | 22 4½ |
| Best Seconds.. .. .. | 25 0 .. | 24 9 .. | 23 6 .. | 21 0 |
| Ordinary Drys .. .. | 22 6 .. | 22 3 .. | 22 0 .. | 20 6 |
| Best Washed Nuts .. | 21 0 .. | 21 0 .. | 20 9 .. | 19 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 19 3 .. | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 6 .. | 21 0 .. | 18 3 .. | 17 4½ |
| Best Seconds .. .. | 20 6 .. | 20 3 .. | 17 9 .. | 16 0 |
| Ordinary Drys .. .. | 18 0 .. | 17 9 .. | 16 3 .. | 15 6 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 15 0 .. | 14 0 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 13 6 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 3 .. | 15 0 .. | 15 0 .. | 12 0 |
| Best Seconds .. .. | 13 0 .. | 13 0 .. | 14 0 .. | 11 0 |
| Smalls .. .. .. | 7 0 .. | 7 0 .. | 11 0 .. | 6 4½ |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Dec. 2 | £54,552 | £58,300 | 48 | £2,663,349 | +£199,051 |
| Auckland..... (28 days) | Nov. 21 | 19,174 | 10,497 | 21 | 92,254 | — 4,949 |
| Ballarat and Bendigo | Sept. 28 | 1,095 | 883 | 26 | 22,632 | — 615 |
| Brazilian St. Rly. Mlrs | October | 44,563 | 52,219 | 13 | 153,572 | + 26,509 |
| Brazilian Traction .... | Nov. 29 | 81,409 | 92,758 | 48 | 4,324,500 | ... |
| Brisbane ..... .. | October | 23,017 | 27,250 | 43 | 260,016 | + 55,967 |
| British Columbia ..... $ | October | 721,621 | 753,501 | 17 | 3,014,355 | + 219,148 |
| Buenos Aires Pt. & City | October | 6,615 | 7,442 | 43 | 68,109 | + 5,294 |
| Buenos Aires Lacroze . | Nov. | 44,671 | 45,746 | 22 | 225,270 | + 8,901 |
| Calcutta.....Rs. | Nov. 29 | 66,550 | 66,424 | 48 | 30,39,024 | + 1,47,691 |
| Cape Town ..... | October | ... | 12,323 | ... | ... | ... |
| Carthagena & Herreria | Nov. | 1,703 | 1,922 | 47 | 28,165 | + 4,820 |
| Cordoba ..... | October | 12,524 | 13,285 | 30 | 94,023 | + 9,280 |
| East India ..... | October | 1,911 | 1,878 | 13 | 5,911 | + 147 |
| Kalgoorlie..... | October | 2,955 | 2,652 | 43 | 29,099 | — 2,644 |
| La Plata..... | Nov. | 5,210 | 5,109 | 44 | 55,840 | + 9,526 |
| Lima..... | Sept. | 22,660 | 34,110 | 39 | 800,647 | + 23,783 |
| Lisbon ..... Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Nov. 30 | 21,902 | 25,530 | 48 | 586,313 | + 41,553 |
| Melbourne ..... | Nov. | .. | 63,500 | ... | ... | ... |
| Mexico ..... $ | October | 586,273 | 646,067 | 43 | 5,782,338 | + 137,633 |
| Montevideo..... | Nov. | 29 623 | 30,530 | 4 | 30,530 | + 907 |
| Para ..... | Nov. 30 | 3,743 | 3,217 | 52 | 206,502 | — 2,021 |
| Port Elizabeth..... | October | ... | 3,553 | ... | ... | ... |
| Shanghai .....$ | Nov. 26 | 20,311 | 23,200 | 47 | 1,056,252 | + 125,311 |
| Singapore .....$ | Nov. 29 | 10,031 | 10,883 | 48 | 573,934 | + 74,445 |
| Toronto .....$ | October | 754,104 | 861,235 | 43 | 8,044,705 | 1,069,557 |
| Winnipeg.....$ | October | 321,039 | 357,313 | 43 | 3,338,748 | + 280,156 |

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Nov. 26 | £1,390 | £1,424 | + £34 | 26 | £43 120 | + £2.719 |
| Accrington Corp. | ,, 26 | 512 | 568 | + 56 | 34 | 19,848 | + 1,882 |
| Ayr Corporation | ,, 29 | 189 | 240 | + 51 | 28 | 12,236 | + 1,737 |
| Bath Electric | ,, 26 | 688 | 748 | + 60 | 48 | 46,240 | + 3,704 |
| Birkenhead Corp. | ,, 30 | 1,216 | 1,416 | + 200 | 35 | 45,551 | + 4,524 |
| Birmingham Corp. | ,, 29 | 11,058 | 12,294 | + 1,236 | 35 | 411,132 | + 36,255 |
| Blackburn Corporation | ,, 26 | 1,110 | 1,284 | + 174 | 35 | 46,743 | + 4,414 |
| Blackpool Corporation | ,, 27 | 438 | 504 | + 66 | 34 | 74,026 | + 11,884 |
| Bolton Corporation | ,, 30 | 2,431 | 2,787 | + 356 | 35 | 96,375 | + 5,762 |
| Bournemouth Corp. | Dec. 3 | 1,391 | 1,621 | + 230 | 35 | 77,293 | + 9,245 |
| Bradford Corporation... | Nov. 29 | 5,035 | 5,594 | + 559 | 35 | 208,720 | + 13,129 |
| Brighton Corporation... | ,, 30 | 751 | 854 | + 103 | 35 | 40,596 | + 2,918 |
| Bristol | ,, 28 | 6,675 | 6,916 | + 241 | 47 | 382,056 | + 51,291 |
| British Elec. Federatn. | ,, 28 | 37,264 | 49,831 | * | ... | ... | ... |
| Burnley Corporation | ,, 29 | 1,446 | 1,631 | + 185 | 35 | 60,160 | + 7,098 |
| Burton-on Trent Corp. | Dec. 1 | 258 | 275 | + 17 | 35 | 10,249 | + 514 |
| Bury Corporation | Nov. 30 | 1,158 | 1,339 | + 181 | 35 | 47,842 | + 2,049 |
| Cardiff Corporation | ,, 22 | 2,373 | 2,684 | + 311 | 34 | 93,815 | + 10,232 |
| Chatham and District.. | ,, 27 | 812 | 812 | Nil | 47 | 41,923 | + 2,818 |
| Chesterfield Corp. | Oct. 23 | 235 | 256 | + 21 | 30 | 7,716 | + 955 |
| Colne & Trawden | Nov. 29 | 231 | 253 | + 21 | 48 | 13,142 | + 794 |
| Cork Electric | ,, 27 | 444 | 446 | + 2 | 47 | 23.726 | + 656 |
| Croydon Corporation | ,, 21 | 1,668 | 1,548 | — 120 | 33 | 56 323 | — 5,576 |
| Darlington Corporation | ,, 29 | 226 | 242 | + 16 | 35 | 8 770 | + 861 |
| Derby Corporation | ,, 29 | 819 | 901 | + 82 | 35 | 34,743 | + 3,610 |
| Dover Corporation | ,, 29 | 188 | 180 | — 8 | 35 | 9,093 | + 203 |
| Dublin & Lucan | ,, 28 | 102 | 112 | + 10 | 21½ | 3,234 | — 22 |
| Dublin United | ,, 28 | 5.317 | 4,747 | — 570 | 47 | 260,258 | — 15,664 |
| Dundee City | ,, 26 | 1,171 | 1,243 | + 72 | 28 | 37,068 | + 2.836 |
| East Ham Corporation | ,, 29 | 1,025 | 957 | — 68 | 35 | 35,835 | — 1,667 |
| Exeter Corporation | ,, 28 | 269 | 286 | + 17 | 35 | 12,330 | + 649 |
| Gearless Motor 'Buses. | ,, 29 | ... | 491 | ... | 34 | 16,991 | ... |
| Glasgow Corporation | ,, 29 | 18.393 | 20,696 | + 2,303 | 26 | 527,905 | + 39,550 |
| Glossop(U.Elec.Supply) | ,, 29 | 120 | 122 | + 2 | 48 | 6,217 | + 599 |
| Halifax Corporation | ,, 25 | 1,802 | 1,940 | + 139 | 34 | 73,800 | + 2,576 |
| Hastings & District | ,, 27 | 711 | 765 | + 54 | 48 | 50,154 | + 3,068 |
| Huddersfield Corp. | ,, 29 | 1,953 | 2,052 | + 99 | 35 | 75,013 | + 4,641 |
| Hull Corporation | ,, 29 | 3,027 | 3,170 | + 143 | 35 | 101,986 | + 6,063 |
| Ilford U.D.C. | ,, 29 | 391 | 433 | + 42 | 35 | 15,897 | — 957 |
| Ilkeston Corporation | Dec. 3 | 109 | 127 | + 18 | 36 | 4,822 | + 762 |
| Ipswich Corporation | Nov. 29 | 856 | 864 | + 8 | 35 | 16,682 | + 726 |
| Isle of Thanet | ,, 29 | 267 | 323 | + 56 | 9 | 3,525 | + 438 |
| Kilmarnock Corp. | ,, 29 | 148 | 166 | + 18 | 28 | 5,042 | + 256 |
| Lanarkshire | ,, 27 | 1 496 | 1,828 | + 332 | 47 | 81,118 | + 10,471 |
| Lancashire United | ,, 26 | 1,306 | 1,551 | + 245 | 47 | 73 641 | + 9,082 |
| Leeds City | ,, 29 | 7,432 | 8,043 | + 661 | 35 | 290,816 | + 18,445 |
| Leicester Corporation... | ,, 29 | 2,606 | 2,796 | + 190 | 48 | 134,520 | + 12,380 |
| Leith Corporation | ,, 29 | 600 | 663 | + 63 | 28 | 20.513 | + 1.012 |
| Leyton U.D.C. | ,, 20 | 1,244 | 1,271 | + 27 | 33½ | 45.615 | + 516 |
| Liverpool Corporation.. | ,, 29 | 11,851 | 12,793 | + 942 | 48 | 616,808 | + 46,565 |
| Llandudno & Colwyn B. | ,, 29 | 160 | 191 | + 31 | 52 | 17.710 | + 1 511 |
| London County Council | ,, 26 | 41,091 | 41.687 | + 596 | 34 | 1,448,122 | + 1,727 |
| London Gnl. Omnibus.. | ,, 29 | 54,147 | 59,002 | + 4,855 | 48 | 2,969,665 | + 505,673 |
| London United | ,, 25 | 5.356 | 5,490 | + 134 | 48 | 301.548 | + 6,222 |
| Lowestoft Corporation | ,, 29 | 163 | 171 | + 8 | 8 | 1,694 | + 143 |
| Maidstone Corporation | ,, 27 | 160 | 178 | + 18 | 35 | 7,348 | + 527 |
| Manchester Corp. | ,, 29 | 16,368 | 17,616 | + 1,248 | 35 | 617,579 | + 31.497 |
| Met. Elec. Trys. | ,, 28 | 8,374 | 8,411 | + 37 | 48 | 433.284 | + 14,980 |
| Nelson Corporation | ,, 29 | 195 | 218 | + 23 | 35 | 7.451 | + 446 |
| N'castle-on-Tyne Corp. | ,, 29 | 4,410 | 5,054 | + 644 | 35 | 170,983 | + 16.220 |
| Newport (Mon.) Corp. | ,, 29 | 692 | 769 | + 77 | 35 | 27.061 | + 2.258 |
| New St Helens & Dist. | ,, 26 | 696 | 738 | + 42 | 22 | 18,583 | + 1,981 |
| Northampton Corp | ,, 28 | 506 | 514 | + 8 | 35 | 20.403 | + 1,969 |
| Nottingham Corp. | ,, 27 | 3,152 | 3.235 | + 83 | 34½ | 116,714 | + 5,433 |
| Oldham Corporation | ,, 30 | 1,838 | 2.171 | + 333 | 36 | 79,689 | + 5.750 |
| Portsmouth Corp. | ,, 29 | 1,605 | 1,872 | + 267 | 35 | 82,729 | + 5,759 |
| Preston Corporation | ,, 26 | 759 | 798 | + 99 | 35 | 31,089 | + 1,973 |
| Provincial | ,, 29 | 1,457 | 1,672 | + 215 | 9 | 15,017 | + 1,077 |
| Reading Corporation | ,, 27 | 613 | 645 | + 32 | 34 | 24 351 | + 1,942 |
| Rochdale Corporation | ,, 29 | 1,383 | 1,549 | + 166 | 35 | 56,852 | + 2 554 |
| Rotherham Corp. | Dec. 3 | 813 | 1,006 | + 187 | 35 | 35,604 | + 8,231 |
| Salford Corporation | ,, 1 | 4,681 | 5,153 | + 472 | 35 | 184 498 | + 7 953 |
| Sheffield Corporation... | Nov. 30 | 6,798 | 7,473 | + 675 | 36 | 262.567 | + 21.941 |
| Southampton Corp. | ,, 26 | 1,085 | 1,198 | + 113 | 34 | 46.647 | + 3.054 |
| Southend-on-Sea Corp. | ,, 26 | 548 | 671 | + 123 | 35 | 35,250 | + 6,143 |
| South Met. Trys. | ,, 28 | 717 | 956 | + 239 | 48 | 44.826 | + 4,563 |
| South Shields Corp. | ,, 29 | 570 | 657 | + 87 | 34 | 25,432 | + 3.148 |
| Sunderland Corp. | ,, 30 | 1.192 | 1.305 | + 113 | 35 | 51,114 | + 5 209 |
| Sunderland District | ,, 26 | 501 | 630 | + 129 | 4 | 2.243 | + 305 |
| Swindon Corporation | ,, 26 | 143 | 151 | + 8 | 34 | 5,806 | + 382 |
| Trys. (M.E.T.) 'Buses | ,, 29 | ... | 8,627 | ... | 44 | 240.281 | ... |
| TynesideTrys.&Tmrds | ,, 26 | 445 | 462 | + 17 | 22 | 11,523 | + 739 |
| Wallasey Corporation | ,, 29 | 983 | 1 084 | + 96 | 35 | 43 579 | + 4.117 |
| Walsall Corporation | ,, 29 | 582 | 621 | + 39 | 48 | 29,920 | + 2,182 |
| Walthamstow U.D.C. | ,, 29 | 592 | 681 | + 89 | 35 | 26,384 | + 840 |
| Warrington Corp | ,, 27 | 438 | 458 | + 20 | 35 | 15,018 | + 502 |
| West Ham Corporation | ,, 27 | 2,493 | 2 567 | + 74 | 34 | 94,450 | + 3.664 |
| Wigan Corporation | ,, 27 | 1,354 | 1.499 | + 145 | 34½ | 51,593 | + 5,195 |
| Wolverhampton Corp | Dec. 3 | 977 | 1.058 | + 81 | 36 | 38,682 | + 2.220 |
| Yorkshire (W. Riding | Nov. 30 | 1,191 | 1.400 | + 209 | 48 | 69,621 | + 7,313 |

* From such of the services as were working both last year and this year the receipts show an increase of £1,679 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Nov. 29 | £5,889 | £5,142 | — £747 | 48 | £233,400 | + £5,322 |
| City and South London | ,, 29 | 3.127 | 2,687 | — 440 | 48 | 133.430 | — 12,712 |
| Liverpool Overhead | ,, 30 | 1,545 | 1,761 | + 216 | 48 | 82.326 | + 6,302 |
| London Electric | ,, 29 | 14,985 | 14.270 | — 715 | 48 | 653 545 | + 725 |
| Mersey | ,, 29 | 2.179 | 2,110 | — 69 | 48 | 107.133 | + 4,702 |
| Metropolitan | ,, 30 | 16,896 | 18,199 | + 1 303 | 48 | 827.777 | + 24,542 |
| Metropolitan District | ,, 29 | 13,839 | 13 646 | — 193 | 48 | 623 308 | + 17.743 |

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## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, December 5. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | + 2 | 72 — 75 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅞ — 4¹⅛ |
| 5 | Do. 5½% Cum. 2nd Pref. | ... | 4¾ — 4⁷⁄₁₆ |
| 100 | Do. 4% Deb. Stk. Red. | + ⅛ | 90 — 92 |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 97½ — 99½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 96 — 98 xd |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 101½ —103½ |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref | ... | ⅞ — 1 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| | Bombay Elec. Supply and Trams. Co., Ord. | + ¼ | 12 — 13 |
| 10 | Do. do. 6% Cum. Pref | ... | 10¼ — 11¼ |
| 100 | Do. do. 4½% Db. Stk. Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | ... | 89¼ — 90¼ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅜ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 6¼ — 6½ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | ... | 115 —120 |
| 100 | Do. Pref. Ord. Stock | ... | 103 —107 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | ... | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 96 —101 |
| 100 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. | ... | 92 — 95 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | ... | 87 — 90 |
| 10 | Do. 7% Non-Cum. Pref. | + 2½ | 52 — 55 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 10 — 13 |
| 100 | Do. Deferred Ord. Stock | + ¼ | 4 — 5½ |
| 100 | Do. 5% Perpetual Debenture Stock | + 1 | 91 — 94 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 77 — 80 |
| 100 | B. Aires Port & City Trms 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 100 | Buenos Ayres Lacrosse Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 98½ —100½ |
| 5 | Calcutta Tramways Co., Limited. Ord | ... | 5⅞ — 6⅛ |
| 5 | Do do. 5% Cum. Pref. | ... | 4⅛ — 5⅜ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld. | ... | ⅞ — ⅞ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 100 | Do. 5% Debs. Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co (1904), Lim. | ... | 5¼ — 5½ |
| 100 | Do. 4% Debenture Stock Red, 1965 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 88 — 92 |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95 — 97 |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | ... | — 10⅜ |
| 10 | Do. do. 6% Pref. | ... | — 11¼ |
| 100 | Do. do. "A" Red. | ... | — 78½ |
| 100 | Do. do. Deb. Stock "B" Red. | — 1¾ | — 77½ |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 9 — 9⅜ |
| 10/- | Hastings & Dist. Electric Trams. Co. Ld., Ord. | ... | ⅜ — ⅝ |
| 1 | Do. do. 6% Cum Pref. | ... | ⅝ — ¾ |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | — 2½ | 84½ — 89½ xd |
| 10 | Imperial Tramways, Ord. | ... | 3¾ — 4¼ |
| 10 | Do do. 6% Cum. Pref. | ... | 6¼ — 6¾ |
| 100 | Do do. 4½% Deb. Stock | ... | 76¼ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2½ — 2⅝ |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — 1/16 |
| 100 | Do do. 5% "A" Deb. Stk. | ... | 85 — 90 |
| 10 | Do do. 6% "B" do. | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | ⅞ — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | — 1/16 | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Do. 6% Cum Pref. | ... | 1⅛ — 1⅜ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | ⅜ — ⅝ |
| 100 | London General Omnibus Company Limited. 4½% Deb. | ... | 95 — 97 |
| 100 | Do. Do 5% Cum. Inc. Deb. Stk. Red. | ... | 85 — 87 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | + 1 | 89 — 93 |
| 100 | Madras Electric Trams. (1904), Lim., 6% Cum. Pref. | + ⅛ | 4⅞ — 5¼ |
| 5 | Do. do. 5% Deb. Stk., Red. | ... | 101 —103 |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 85 — 87 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 109¼ —112½ |
| $1,000 | Do. do. 5% Bds. | ... | 98½ — 98¾ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref | ... | ⅞ — 1 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 88 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| $100 | Mexico Tramways Co., Common Stock | ... | 78 — 81 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 80 — 85 |
| 100 | Do. 6% 50-yr. Mort. Bonds | — ½ | 82½ — 85½ |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | + ½ | 91 — 93 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | ... | 98 —100 |
| ... | National Steam Car Co. Ltd | + ⅛ | 1⅛ — 1⅜ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 5⅜ — 6⅛ |
| 10 | Do do 5% Cum Pref. | ... | 5⅝ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 5¾ — 6¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec Trams. Ld., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co. Ltd., Ord. | ... | ⅞ — 1 |
| 1 | Do. 5% Cum Pref | ... | ⅞ — 1⅛ |
| 100 | Do. 4½% Debenture Stock, Red. | + 1 | 84 — 87 |
| 1 | Provincial Tramways. Lim. Ord. | ... | 33/32 — 37/32 xd |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 83 — 85 |
| 5 | Rangoon Elec Trams & Supply Co 6% Cum. Pref. | ... | 5⅛ — 5⅝ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 97 — 99 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 84 — 87 |
| $500 | Rio de Janeiro Trys. Lgt. & Pr. Co. 1st Mt 30-yr. 5% Gd. Bds. | + + | 99¼ —101¼ |
| 100 | Do. do. 5% 5-yr. Mort. Gold Bonds | + + | 89½ — 91½ |
| 10 | Sao Paulo Tr. Light & Power Co. 5% Perp. Cons. Debs. | — 2 | 97 —100 xd |
| $500 | Do. 5% 1st Mort. Debs., Red, 1939 | ... | 99 —1.2 |
| 10 | Shanghai Elec. Construction Co. | — ¼ | 9¾ — 10¾ |
| 100 | Singapore Elec. Tramways Lim.. 5% Debs. Red | ... | 86 — 90 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum Pref. | ... | ⅝ — ¾ |
| 100 | Do. do. 4% Deb. Stk. | ... | 68 — 72 |
| | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 85½ — 87½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4⅞ — 5¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4⅞ — 5¼ |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 95 — 97 |
| £ | Yorkshire (West Riding) Elec Trys Co. Ord. | ... | ¼ — ½ |
| 5 | Do. do. 6% Cum Pref | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 81 — 86 |

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

ESTABLISHED 1892. LONDON, DECEMBER 11, 1913. VOL. XXXIV.

# LONDON UNDERGROUND RAILWAY DEVELOPMENTS.

## THE CHARING CROSS AND THE PADDINGTON EXTENSIONS.

Among the numerous developments which are taking place, or are about to be entered upon, in connection with the great system of underground electric railways in London, there are two of special interest at the present time. One of these is an extension which has just been opened, and the other an extension possessing special engineering features which will shortly be ready for traffic. The former is a prolongation of the Baker Street and Waterloo Railway from Edgware Road to Paddington, and the latter an extension of the Charing Cross, Euston, and Hampstead Railway from the present terminus at Charing Cross to the Victoria Embankment. We shall deal first with the Charing Cross line, as the work there is of a nature which is in some respects unparalleled.

The Charing Cross, Euston, and Hampstead Railway was opened for traffic in June, 1907, and a fully illustrated description of it appeared in our issue of July 4 of that year. The line extends from a terminus under the forecourt of the South Eastern Railway Station at Charing Cross northwards to Camden Town, where it diverges into two branches, one to Highgate and the other to Hampstead and Golders Green. Its total length is eight miles, double track, each track being carried in a separate circular tunnel, after the manner usual with tube railways. The train service on the part of the line between Camden Town and Charing Cross in one of the most frequent in the world. For a long time it has been obvious that advantage would accrue, alike to this railway, to the Metropolitan District and Baker Street and Waterloo Railways, and to the public, if the Charing Cross and Hampstead line could be extended from the present Charing Cross terminus for a distance of some 200 yards to the Thames Embankment, so that an interchange station with the Metropolitan District and Bakerloo Railways might be provided there. The present Charing Cross stations on the District and Bakerloo lines adjoin one another, and are connected by a long sloping passenger subway, but there are no lifts nor escalators. The inconvenience arising from this cause would also be removed by a satisfactory scheme for extending the Charing Cross line. An Act of Parliament was accordingly obtained in the session of 1911, authorising the construction of this short extension, together with a balloon-shaped loop partly under the Thames, round which trains could be sent, and so obviate reversing and crossing over at a dead-end terminus. The work of construction began in October, 1911, and it is expected that the extension will be opened for traffic in March next.

The extension, as will be seen from the plan on the following page, forms a single track loop which measures in all 880 yards, and at its southern part it passes under the River Thames and reaches 65 yards beyond the Thames Embankment wall. The south-bound trains will run from the present terminus round the loop to a new single-platform station underneath the station of the District Railway, and adjoining the station of the Baker Street and Waterloo Railway. Then the trains will continue northwards, and join the existing north-bound line. Peculiar difficulties have been encountered in the work. The whole of the land for some distance inside the Embankment wall may be described as water-logged; it is, in fact, a sort of underground lake, of which the wall, which goes right down to the clay, forms one side. The ground behind it receives water from the higher land to the north. Another feature was that the available space between an electric sub-station adjoining the District Railway station and the overhead railway bridge of the South Eastern Railway Company was very limited. Moreover, the South Eastern Railway Company are in possession of powers for widening their bridge. It accordingly became necessary that the new station of the Charing Cross and Hampstead line should be built partially under the west side wall of the electric sub-station, and it was necessary to underpin a portion of the District Railway station building, which is now being re-erected on a more elaborate scale. The whole of the cables supplying current to the Charing Cross and Hampstead Railway had to be diverted from a cable shaft which the station tunnel cut right through, and piers had to be provided in view of the widening of the Thames bridge.

At the west end of the electric sub-station accordingly it was necessary to cut down from the surface and put in underpinning to support the sub-station wall. This cut was really a large open shaft and had to be of greater dimensions than would otherwise have been necessary as an enlargement of the electric sub-station had to be provided for, and also the erection of the piers just mentioned. Substantial brick side walls were constructed supporting an arch which carries the sub-station wall and the floor of the extension. The arrangements were such that the tube tunnel does not carry the weight, that being taken by the brick arches. The cut had to go down 65 ft. below the street level for the purpose of putting in the invert of the station tunnel. The top of this tunnel is 40 ft. below the surface. This cut extended for a distance of about 66 ft. longitudinally, and it was situated centrally with respect to the length of the new Hampstead Railway station platform to be constructed. An enlargement was made at one end

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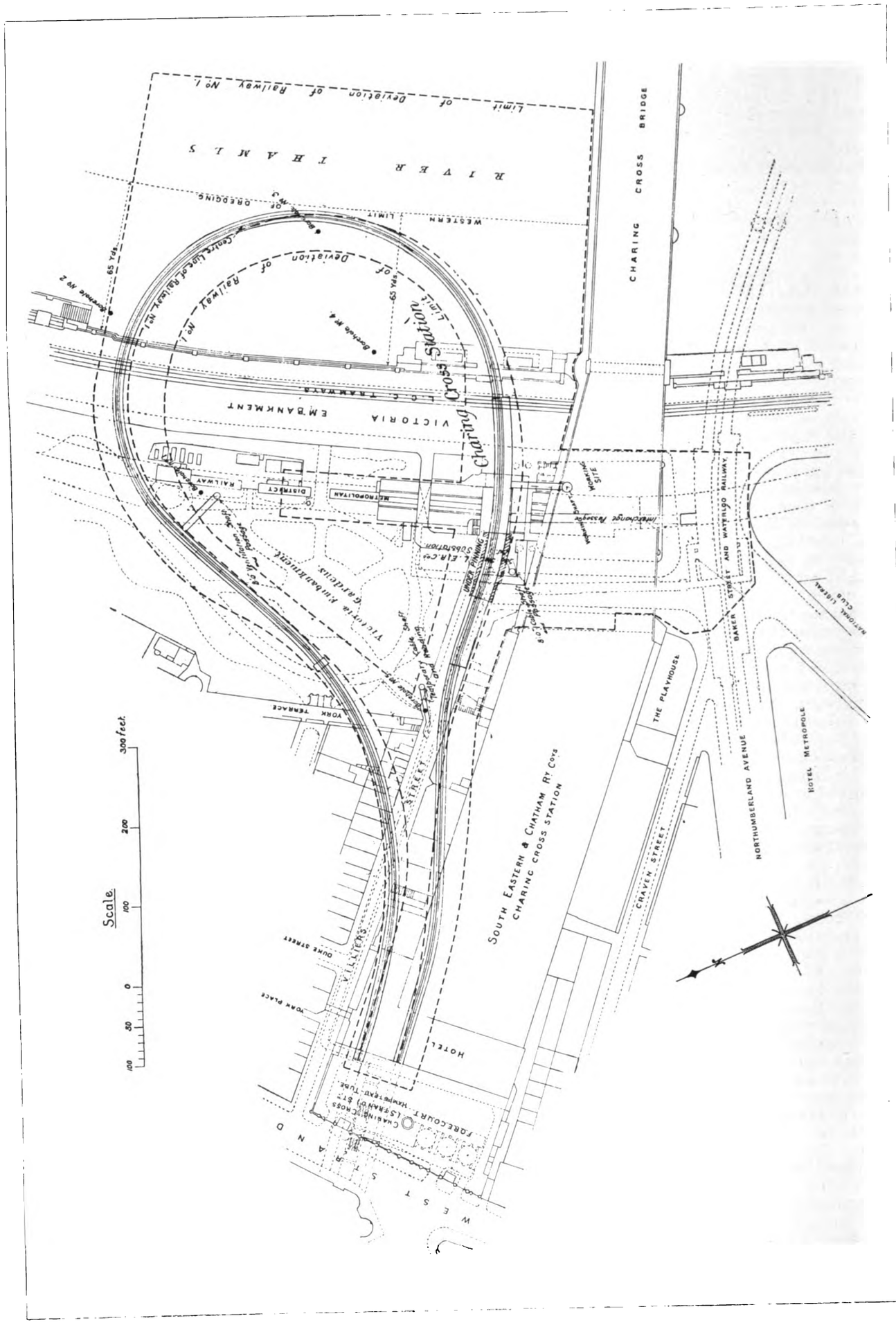


Plan of Thames Embankment Extension of Charing Cross and Hampstead Railway, Showing Position of Loop partially under the River Thames.

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of this brick length to provide a shield chamber for constructing the station tunnel. The station itself extends for some distance north and south of this point, the total length being 350 feet.

A working shaft was constructed underneath the South Eastern Railway bridge, and from there a little service heading was driven to a point which was to become the centre of the tunnel, and was then curved round to make a connection with the open cut before referred to. The top of the tunnel, as constructed, is in the water-bearing strata, the lower part of it being in London clay. Normally there are about 13 or 14 ft. of water in the gravel overlying the clay. In the circumstances, the tunnel had to be driven with the aid of compressed air. The shield was erected in the bottom of the open cut, and the top of the shield was covered with puddled clay, so as to keep the air in. This clay was weighted with iron segments (to be used afterwards in tunnel lining), so that the roof might not be blown up by the air pressure. Then the shield was started forward, and work proceeded steadily. A hooded shield was used, and the tunnel was constructed by the clay pocket system of tunnelling, as used when the Baker Street and Waterloo line was constructed under the river. Holes were dug by hand in the ballast round the hood of the shield. These were filled with puddled clay, and the shield was then pushed forward into it. By this means a great deal of timbering work was obviated. The top of the tunnel is only 10 ft. below the foundations of the District Railway, yet tests on the platforms of the station on that line showed that there was no sign of any settlement. This is a very good achievement considering the size of the new station tunnel and that it was being driven under a substantial building.

The station tunnel with which we have been dealing is 21 ft. 2½ in. in diameter. Coming now to the running tunnel under the river, which is 12 ft. 9 in. in diameter, there are only from 18 in. to 3 ft. of clay above the top of this tunnel, and above that is the water-bearing ballast forming the river bed. The air pressure in the tunnel had therefore to be very carefully regulated in order to balance the pressure of the water in the river, which varied with the rise and fall of the tide. For this purpose a special tide gauge was erected on the Charing Cross landing-stage. It consisted of a long plank of wood with a scale marked on it. It was so graduated as to indicate the air pressure necessary to be equal to the head of water at any particular time. A man examined this gauge every hour, and the air pressure in the tunnel was regulated accordingly. In the air-pumping engine room there was besides a clock dial with a movable circle round it, which was so adjusted as to give the engine man an idea as to how the tide was requiring changes in the air pressure. The dial was adjusted from hour to hour by examination of the gauge in the river. The air pressure required in the tunnel varied from 9 lb. to 18 lb. per square inch. With all these arrangements the work proceeded smoothly and satisfactorily. The curve of the tunnel had to be sharp, so as not to interfere with the navigable channel of the river, where dredging may be carried on in future. This was the more necessary as the top of the tunnel is less than 10ft. below the bottom of the river. The dredging limit is 65 yards out from the Embankment wall. The part of the tunnel which is under the Thames was commenced on November 2, 1912, and was finished on March 6 last.

As will be seen in the accompanying plan, the District Railway at Charing Cross runs at right angles to the Baker Street and Waterloo Railway and the Charing Cross and Hampstead Railway, the District station being situated between the two. Ten feet below the District station platforms at the west end there has been constructed a large circulating area. This area is approached by stairs from each District platform. From the level of this area two escalators descend to the Charing Cross and Hampstead Railway station, and two to the existing Bakerloo Railway station. The arrangement is clearly shown in the two cross-sections which are herewith reproduced. By this scheme the long sloping passenger subway which has hitherto been used between the District Railway and the Bakerloo Railway will be abolished.

The escalators, which are of the Otis Elevator Company's make, will, in the case of the new railway, land the passengers at the platform level, but those for the Bakerloo line will land them 10 ft. above the platform level (as the railway has to be crossed by a bridge), the platforms being thereafter approached by stairs. Each pair of escalators consists of an ascending one and a reversing one, the latter normally running downwards, but in the case of a breakdown of the other it can be reversed in direction, so that whatever happens there will always be one to run uphill. A spiral staircase is also being provided in the working shaft. The escalators to the Hampstead Railway platform have a 28-ft. rise, and those to the Bakerloo station a 32-ft. rise. It will also be seen from the drawings that passengers changing from the Hampstead to the Bakerloo Railway, or *vice versa*, will be able to do so without ascending, as a deep-level passenger subway is provided between the two tube stations and passes directly underneath the District Railway station.

Mr. H. H. Dalrymple Hay, to whom we are indebted for information embodied in this article, has acted as consulting engineer, with Mr. G. Blacklock as resident engineer, on behalf of the London Electric Railway Company. The work was carried out by Messrs. John Mowlem and Company as contractors, with Mr. W. Rowell as contractors' agent. The staff of the London Electric Railway Company have, however, laid the permanent way, and attended to various details. The permanent way, which is now practically completed, is similar to that on the existing portion of the Charing Cross and Hampstead Railway. It will be remembered that there the sleepers are laid on a concrete bed, and that the ends are overhung, the rails being mounted on the overhung ends, so that a certain amount of elasticity is given to the track. Third and fourth rail electric conductors are, of course, employed.

The work of erecting the new railway station building above the District Railway at Charing Cross is now advancing. The frontages will be of white Portland stone, and the roof will have a glass dome. New staircases down to the District platforms will be provided.

### The Paddington Extension.

The extension of the Baker Street and Waterloo Railway from Edgware Road to Paddington, a distance of about half a mile, was also authorised by Act of Parliament in 1911. Since then, of course, authority has been given to extend the line still further, and to make a junction between it and the London and North Western electric line at Queen's Park, near Willesden. That part of the work is now in progress, but will not be completed for some time. The original line was opened for traffic in March, 1906, and was described and illustrated in our issue of March 8 of that year. The extension from Edgware Road to Paddington was opened for traffic on the 1st inst. Starting from Edgware Road, the tunnels run underneath a basin of the Grand Junction Canal, and then under Praed Street, crossing that thoroughfare twice. The line

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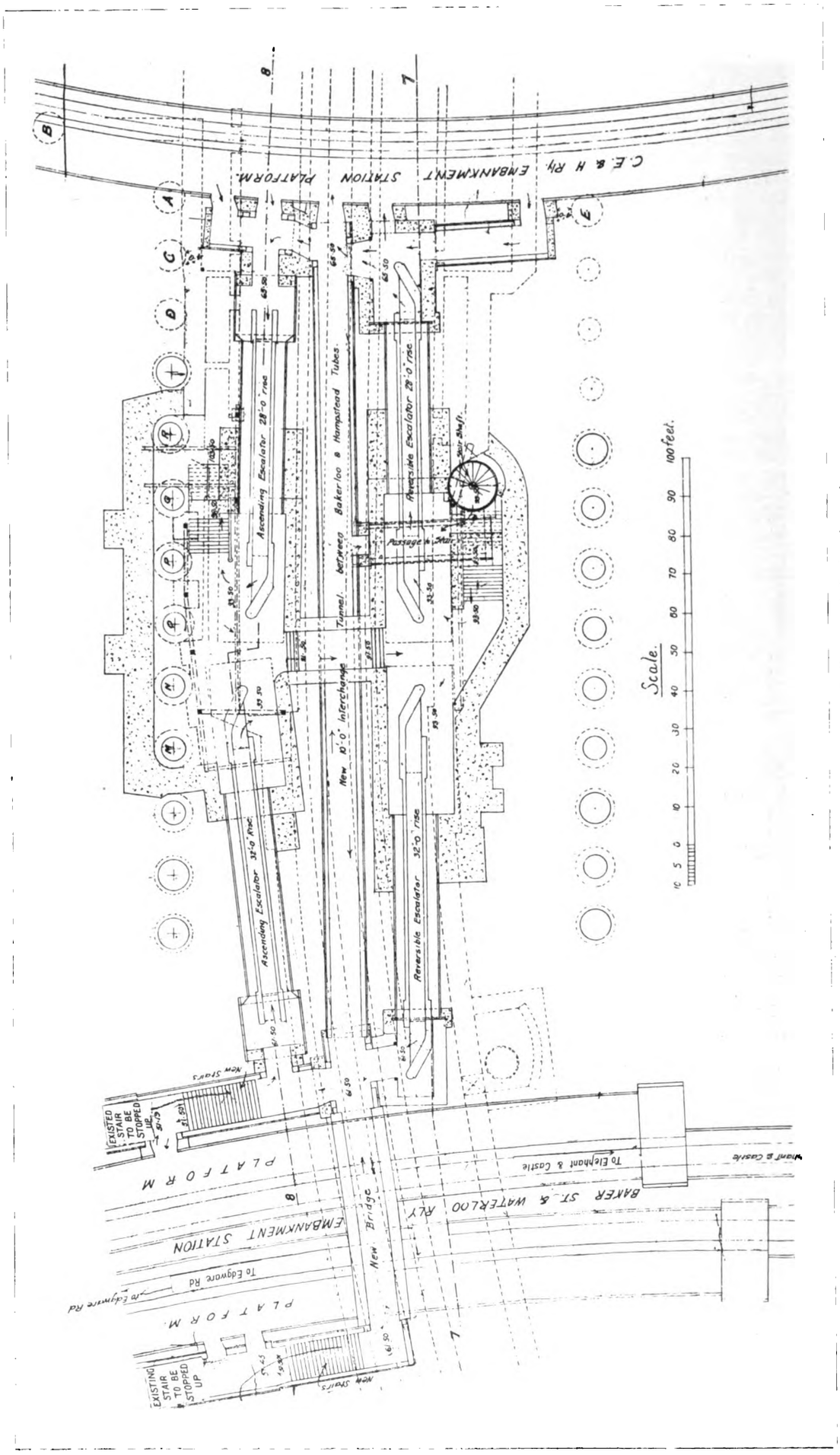
C.E. & H. Rly. EMBANKMENT STATION PLATFORM.
Ascending Escalator 28'-0" rise
Tunnel between Baker loo & Hampstead Tubes
Reversible Escalator 28'-0" rise
Passage & Shaft
Shaft
New 10'-0" Interchange
Ascending Escalator 32'-0" rise
Reversible Escalator 32'-0" rise
Scale.
0 5 10 20 30 40 50 60 70 80 90 100 feet.
New Stairs
EXISTED STAIR TO BE STOPPED UP
PLATFORM
EMBANKMENT STATION
To Edgware Rd
New Bridge
BAKER ST. & WATERLOO RLY.
To Elephant & Castle
EXISTING STAIR TO BE STOPPED UP

**Plan of Intersection of the Three Railways at Embankment.**

(Baker Street and Waterloo, Charing Cross, Euston and Hampstead, and Metropolitan District Railways.)

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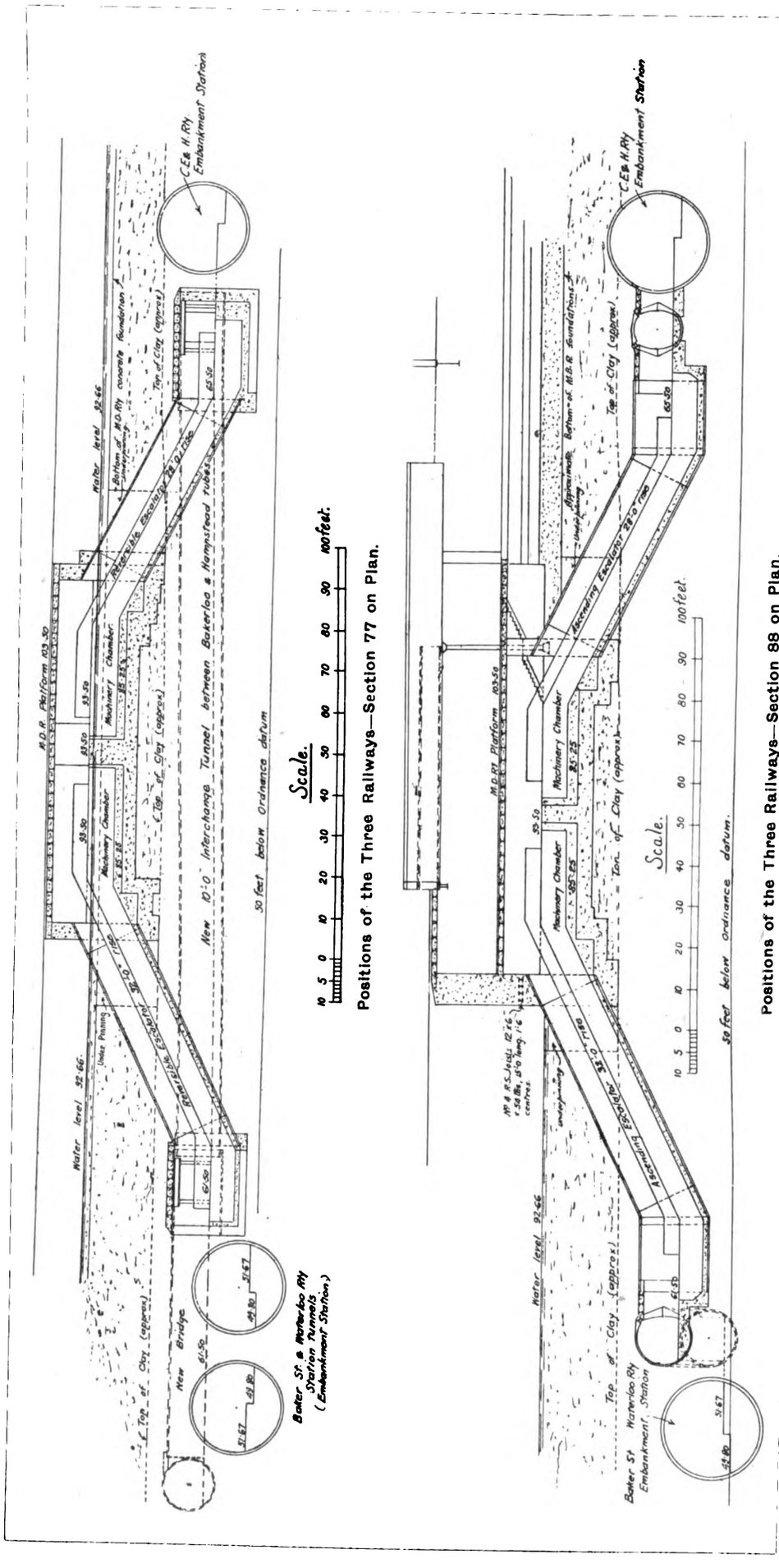
Scale.
Positions of the Three Railways—Section 77 on Plan.
Positions of the Three Railways—Section 88 on Plan.
New 10'0" Interchange Tunnel between Baker Loo & Hampstead tubes
50 feet below Ordnance datum
Water level 92·66
Top of Clay (approx)
Baker St & Waterloo Rly Station Tunnels (Embankment Station)
C.E. & H. Rly Embankment Station
M.D.R. Platform 103·50
Machinery Chamber
Ascending Escalator 22'0 rise
Descending Escalator 22'0 rise
New Bridge
Baker St Waterloo Rly Embankment Station

then bends to the north, and runs under the Paddington terminus of the Great Western Railway. Beyond the station which has been constructed there is a cross-over road for reversing the trains. This will be used until the extension beyond Paddington is opened. There is nothing particular about the tunnel work, which is all in the London clay, and the tubes are 12 ft. and 12 ft. 6 in. in diameter. The only sharp curve is one of five chains radius, where the tunnels bend round into Paddington. The steepest gradient with the load is 1 in 30, and against the load, 1 in 60. These are the retarding and accelerating gradients for trains entering and leaving Paddington.

A flight of steps leads down from London Street to a booking hall which has been constructed underneath the cab road on the arrival side of the Paddington terminus. The subway from the Metropolitan Railway station at Praed Street to the Great Western station has been altered so as to admit also of passengers reaching the new booking hall by this means. There is also a subway from the new widened portion of the Great Western terminus. Leading from the booking hall to the new station is a tunnel 21 ft. 2½ in. in diameter, in which there are two Otis escalators, one ascending and the other reversible. Between the escalators there is an ordinary fixed staircase. The rise of the escalators is 40 ft., and they lead right down to the station platform level. The level of the rails is 60 ft. below the street. The permanent way arrangements are similar to those of the existing Baker Street and Waterloo and Charing Cross and Hampstead Railways. The engineers and contractors for this extension are the same as in the case of the Charing Cross work.

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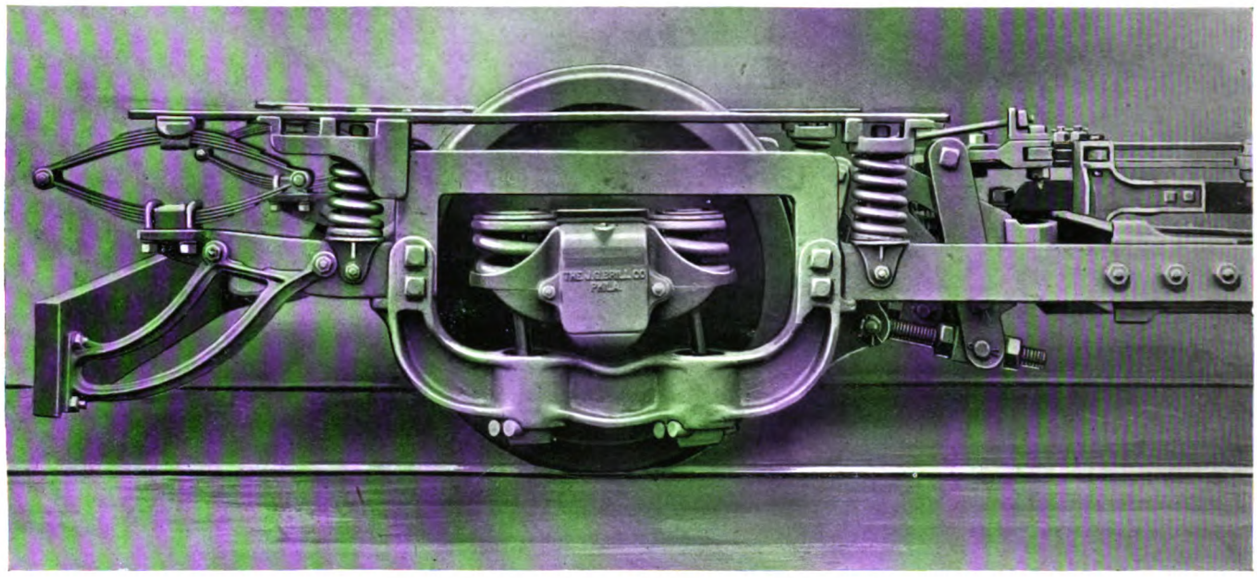
## BRILL PATENTED "RADIAX" TRUCK.

At various times in the development of electric railways the radial-axle principle has been taken up, but until recently no satisfactory results have been obtained, although many trucks have been built. These trucks have been of two classes, one having each pair of wheels in an independent frame and the other having both axles within the same frame; the first has the advantage of lightness and the other of furnishing a better spring support to the car body. Six-wheel radial trucks have so limited a field that they need not at present be considered. The large size of the early electric motors precluded success, but the advantages of having a longer wheel base for four-wheel cars have all along been so evident that all truck builders have given more or less attention to the subject, with the hope of some day working it out to a successful conclusion. Curves in city tramway systems generally do not permit a wheel base of a non-radial-axle truck of more than 7 ft. 6 in., and therefore the overhang of cars measuring 28 to 30 ft. over the platforms, and in some cases having vestibules and carrying a large part of the load outside the wheel base, have made it impossible entirely to obviate oscillation. In Vienna, Nuremberg, Moscow, St. Petersburg, and some other European cities, and in several cities in this country, the single-axle truck has been considerably used and in most instances discarded. During the period 1905-1907 several tramways in this country introduced improved radial-axle trucks, both of the single and double-axle type, but without success. Like their predecessors, these trucks led the way to a better understanding of the subject, and the enterprising tramway managers who were willing to give them a thorough trial have paved the way for the successful type. Some of the principles of construction were developed in attempts to correct the difficulties which were discovered after the trucks were put in service, others were taken from non-radial-axle trucks, and still others were devised to meet the contingencies which arose in the better understanding of the conditions to be met.

The experiments of the J. G. Brill Company with radial-axle trucks, covering a long period, culminated in the type illustrated. This truck is now in use on many American lines, including the Philadelphia Rapid Transit Company, the Milwaukee Electric Railway and Light Company (two lots have been ordered since the first proved successful), Memphis Street Railway Company, Union Electric Company of Dubuque, Union Street Railway Company of New Bedford. Among other users are the Linares Tramways of Spain, Lisbon Tramway Company, Port Elizabeth Electric Tramways Company, Hobart Tramways and Launceston Tramways, Tasmania, Kioto Electric Traction Company, and both the French and English tramways of Shanghai, China.

Like the other types of Brill trucks, the "Radiax" is built with solid forged side frames, and to this principle of construction the makers attach fundamental importance. The solid forged frame is considered to be especially necessary for the long-wheel-base truck of a radial-axle type. This principle has been followed in the construction of the frame of the Brill rigid-wheel-base No. 21-E truck during a period of 20 years, and it is maintained that it is plainly evident that a longer frame with wider yokes makes an even greater demand for the strongest, lightest, and best-possible construction. Castings, however well designed and made, should, of course, be avoided where it is possible to use solid forgings.



The Swing Link in the Brill "Radiax" Truck.

In explaining the principle on which the Brill truck radiates, it should be first stated that the early designs of radial trucks, used chiefly in Europe, relied on sliding surfaces or rollways between the radiating and the non-radiating portions of the truck, which necessitated what was virtually a double frame. These trucks would radiate if well lubricated and kept in good condition, provided that the curves were taken at a speed high enough to bring into play sufficient centrifugal force. The chief difficulty was that there was no force available to return the truck to its normal position on leaving a curve, and reliance had to be placed on springs to produce this effect. The springs required constant and careful adjustment, for if they were too powerful they would check radiation and if too weak the wheels would gag or leave the rails. It was found that swing links, by which the load was suspended below the axle, reduced friction to a minimum and at the same time tended to keep the axles in parallel without the use of springs or other devices. But the swing link has a grave defect, in that on straight track it transmits to the car body every irregularity of the track with multiplied effect, and this is particularly noticeable in cars having a wheel base

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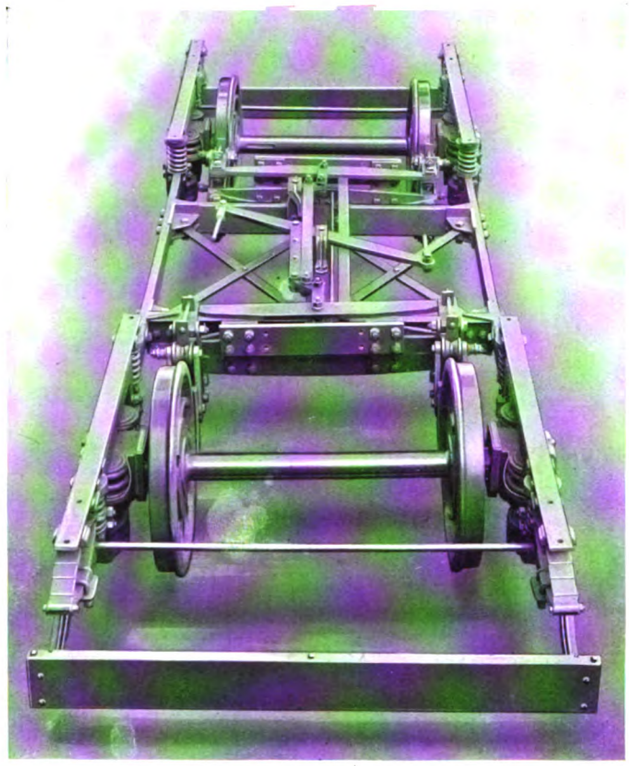
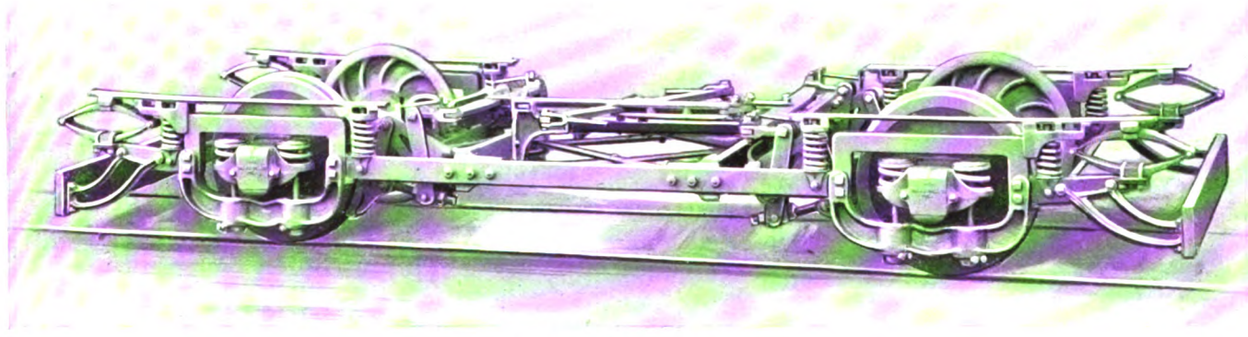
shorter than 11 ft., as the king pins are necessarily close together, giving the whole construction a small amount of lateral stability. Therefore the ordinary swing link radial-axle truck is generally found to oscillate horizontally, causing a snakelike motion. Until a means was found of obtaining free radiation, coupled with the return of the axles to their normal position on leaving a curve and at the same time holding the car body in a direct line on straight track, the radial-axle truck was doomed to failure.

In the Brill truck the swing link is made to perform its functions in a manner which gives both free radiation to the axles and stability and easy riding to the car body, by a patented device of the J. G. Brill Company. This consists of pairs of swing links of special form, mounted on spiral springs which rest in ears cast on each side of the journal boxes. The upper end of the link is of hemispherical form and rests in a socket casting at the top of the spring. The link passes through the spring, and at its lower end has two pins, or trunnions, which engage in grooves formed in a casting enclosing the lower part of the frame yoke. On straight track, with the link in upright position, the frame rests on both pins. When a movement of the swing link commences, as the car passes over some irregularity in the track, at that instant one or other of the pins comes out of engagement with its groove, even though the movement is imperceptible, thereby producing an inclination between the two supporting points of the link equal to half the distance between the pins, which sets up an immediate and powerful tendency to return to normal position. If the link were pivoted on a single pin at the lower end, the swing would require to be considerably more, or half the distance between the two pins of the Brill device, to produce an equal force to assist in returning the axle to its normal position. As the pin returns to its groove, any tendency of the link to swing past its normal position is instantly checked by the sudden force in the opposite direction generated as the other pin leaves its groove. It will therefore be seen that the double-pin arrangement has a two-fold office—one to assist in holding the link in an upright position against the effect of irregularities of the track, and the other to assist the link in its tendency to draw the axle back to its normal position when leaving a curve, or when the normal position of the axle is disturbed momentarily owing to track irregularities.



Brill "Radiax" Truck.

The double-pin device does not hinder the primary function of the links, that of allowing the axles to radiate freely on curves. The links are much longer and permit a considerable radial movement of the axles to take place without requiring them to assume an excessive inclination, the resistance generated by their inclination being overcome by the centrifugal force stored in the car. If the car is stopped on a curve, the axles will return gradually towards but never quite resume their normal position, but will rapidly increase their angle of radiation as the car is started again. It should be remembered that a radial truck can safely take curves at a much higher speed than a rigid-wheel-base truck and that the faster a curve is traversed the easier a truck will radiate and the less will the flange wear.



Brill "Radiax" Truck.

An important feature of the Brill "radiax" truck is the use of the motor as the only means of connecting the axle to the king bolt, which is the pivotal point; the motor, being rigidly connected to the cross member which carries the brake rigging, causes the axle and brakes to radiate with it as a whole from the king bolt

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and form a complete unit corresponding to a single-axle pivotal truck. In old types of radial-axle truck construction it was usual to construct a complete pivotal frame, usually called a sub-truck; this frame connected the journal boxes with the king bolt and supported the brake rigging and the motor. It is difficult to obtain a rigid construction in such a frame and at the same time allow room for the motor, and, of course, it adds very considerably to the weight of a truck of this class. There is no objection to pivoting to the motor; the most exhaustive tests have proved that it does not produce undue wear on the bearings, and the ordinary construction of motor frames is amply strong to offset any risk of failure owing to the extra strain. Careful measurements taken from motors in service have shown that the motor bearings wear less in horizontal direction, due to the brake thrust, than they do in a vertical direction, owing to the weight of the motor, and that the life of the motor bearings is limited by vertical wear and not by horizontal wear which would allow the gears and pinions to get out of pitch with each other.

Brake gear has been a constant source of trouble on most designs of radial-axle trucks. In the Brill "Radiax" truck the brakes are fitted with inside-hung shoes, the advantages of which are well known; the brake rigging is arranged with the pivotal points directly over the king bolts, giving the same radial action to the brake beam as to the wheels and providing an equal pressure on the whole surface of all four brake shoes against the wheel treads. The other brake details have been completely developed, and experience has proved them to be reliable.

The patented "half-ball" brake hanger is used in all Brill trucks, and is self-adjusting for wear, and therefore noiseless. The spring arrangement is the same in principle as that which has proved so efficient in the Brill standard non-radial axle single truck No. 21-E.

By providing a long wheel base to the car body the radial-axle truck reduces the overhang and therefore eliminates galloping motion, uncomfortable to passengers and destructive to the car and roadbed; it reduces the side overhang on curves, and by furnishing a more extended support permits a lighter construction of the car body; it also secures the full tractive force of the wheels, not obtainable in a two-motor equipment of an eight-wheel car. This truck is intended for cars longer than suitable for mounting on non-radial-axle types and of lengths up to 26 ft. over the body corner posts. It has been designed to interchange with any type of non-radial-axle truck with slight modifications of the car bottom framing and motor trap location, where the car body is of a length which would make it desirable to use the radial-axle principle. The "Radiax" E1 truck is built to carry a car at the same height above the track as the Brill No. 21-E truck.

**Manaos Tramways and Light Company.**—The tramway receipts amounted to £106,148, and the lighting to £44,148, against £109,718 and £35,602 respectively for the previous year. The result of the company's operation for the year is a surplus, after meeting debenture interest and sinking fund, of £28,107, which compares with £16,318 for the previous year. During the year under review £21,509 has been spent on capital account, the principal items being four new cars and certain additional track work. To the above-mentioned balance of £28,107 must be added the amount brought forward from the last account, making a total of £31,435. The directors propose to transfer to contingencies reserve, making a total to the credit of this account of £15,725 (after writing off an amount of £4,274), £10,000; to transfer to renewals reserve, making a total to the credit of this account of £21,000, £6,000; to pay a dividend on £300,000 ordinary shares at the rate of £4 per cent. per annum, leaving a balance to be carried forward to next year's accounts of £3,435. At the annual meeting on August 14 the chairman, Mr. I. M. Booth, reported that the company had been unable to recover from the State of Amazonas the debt of £23,676 due to them.

## PETROL-DRIVEN TRAMCARS.

### The "Simplex" System at Karachi.

At the present time, when tramways in general are being menaced by new forms of road vehicles, the annual report of the East India Tramways Company, showing the extraordinary success of the "Simplex" system of petrol tramcars as worked by that company at Karachi, should receive special attention. Before referring to the cars, which have enabled the company to obtain such excellent results, it will be interesting to trace briefly the history of the East India Tramways Company, in order to show their varied experiences, and their reasons for installing this type of traction.

The tramway concession for Karachi was obtained in 1882, and the main line of five miles laid in 1885, and subsequently a branch line two miles long in 1892. The tramway was at first equipped with small steam locomotives hauling first and second-class coaches. The locomotives, however, very soon succumbed to the trying conditions of continuous dust and bad fuel, and were within a year laid on the scrap heap. The company then resorted to horse traction with little better success, until the year 1901, when they were obliged to go into liquidation.

The company was, however, reconstructed, and the new company continued with the horses, improving the cars but making very little headway. About 1908 they were confronted by the problem of having to face the making by the Karachi Port Trust of a long and steep overbridge over which their main tram line had to be diverted. This would make their wavering horse traction still more difficult to work. Various forms of horse traction were then considered, and it was decided that the meagre traffic and short distances would not bear the heavy expense of electrification.

The company therefore determined to try the petrol engine, which was then proving itself very reliable for road transport. This was adopted in conjunction with the Dixon-Abbott patent transmission gear, and is now known as the "Simplex" system. The justification of the company's decision is proved by the running costs during the past four years, which are, we understand, the lowest on record for any type of similar passenger vehicle yet invented. This is further borne out by the steady increase in dividends paid out since the adoption of the "Simplex" cars. The deferred shareholders having received no dividend up to that time, received 1¼ per cent. on the first year, then 5 per cent. and 10 per cent., and this year a dividend of 5 per cent., with a bonus equal to 66⅔ per cent., has just been declared.

The cars employed are of the "Simplex" open type, with cross benches of curved wood slats, with which exception they might be termed as of the "all steel" category. The general view can be gathered from the accompanying illustration.

The cars are self-propelled by mechanism completely contained beneath the central seat, which is immediately removable by simply sliding backwards, thereby making the power unit easily accessible. This mechanism has now been reduced to the simplest possible form consistent with great durability and reliability, and comprises essentially a prime mover in the shape of an especially designed internal combustion motor, a clutch for connecting and disconnecting the motor from the transmission gear, and the transmission gear.

After much research work, and contrary to the usual automobile practice, it was found that the motor to give the best results was of the 2-cylinder type burning heavy petrol known as ·760 spirit, or benzine; it is fitted with the usual high-tension magneto ignition,

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automatic lubrication, and positive water circulation. As this engine has a singularly steady torque over a very large range of speed, it is found practicable to run entirely on what is known by automobilists as "top speed," while the second or starting speed gear is only used for overcoming the initial moment of inertia of the car and for emergency cases. The shock of gear changes so noticeable on the motor omnibus and like machines is thus much reduced, and the jerk associated with the electric controller is entirely obviated. The design of the clutch necessarily aids this method of working materially. The clutch consists of male and female cone lined with a bonded fireproof substance, and operated by a system of balancing springs which prevent undue strain on the gear.

The transmission is the key-note of the whole system, and is manufactured under the Dixon-Abbot patent. It consists of parallel gear chains, enclosed in an absolutely oil-tight case, giving two-speed ratios with exceptionally few wheels and shafts, and it can be operated in either direction from either end. So simple and compact is this gear that it can be made of unusually large and durable dimensions, and yet is, with the engine and clutch, placed transversely across the centre of the car, so that the power is entirely transmitted to the road wheels through parallel shafts by means of a central heavy silent chain, thus displacing all bevel wheels and the necessity of taking the power round corners. The friction is therefore reduced to a minimum, and the efficiency is very high indeed; the petrol consumption of the whole fleet in service averaging 9 miles per gallon.

The effect of this centralisation of weight is to produce a very smooth and easy-running car, practically free from all vibration, and yet so robustly built that after four years' work it continues to be thoroughly satisfactory. It also has the effect of enabling a car weighing only $3\frac{1}{2}$ tons in working order to seat 46 passengers. It might be here mentioned in connection with the weight that the existing metals used by the former horse cars have proved sufficient for the petrol cars without shewing weakness at the joints.

The control is, according to usual tramway practice, from either end of the car, the driver standing behind the dashboard operating removable "fool-proof" levers, which are arranged so that it is impossible for any unauthorised persons to tamper with the non-driving end. It is possibly due to the position of driver and general appearance of the car, that something like nine-tenths of the population will insist that Karachi possesses an electric tramway.

In view of the great simplicity and light weight of the "Simplex" system, it is possible to understand how the East India Tramways Company (as shown in their annual report just published) were able to run during their past year 566,685 car-miles, at a total average cost of 2·19d. per mile for petrol, lubricating oil, repairs, and maintenance, while the total operating costs, including office expenses and full depreciation, averaged only 4·93d. per car-mile. This figure explains why the East India Tramways Company are able to make fares as low as one farthing profitable.

Both the operating company and the patentees (the Motor Rail and Tram Car Company, Limited, 79, Lombard Street, London, E.C.) may be fairly congratulated on this record result, and we shall not be surprised if in the near future this system is adopted in many places where roads bearing heavy traffic are difficult to maintain during all seasons of the year, except at very heavy cost, but where either tramways or light railways under this system could be made a financial success.

"Simplex" Petrol Car—East India Tramways Company.

**Lancashire and Cheshire Municipal Tramway Managers.**—A quarterly meeting of this Association was held at the Victoria Hotel, Manchester, on November 21, when there were present: Alderman Linsley, J.P. (president of the Municipal Tramways Association), Mr. J. M. McElroy (Manchester), in the chair, Messrs. J. Barnard (Bolton), F. Buckley (Wigan), W. Clough (Bury), A. T. Eardley (Stockport), R. R. Greene (Wallasey), Hosken (Darwen), E. Holt (Ashton), Barnes Kay (Haslingden), Mozley (Burnley), Smith-Saville (Darwen), Stewart (Rawtenstall), Simpson (Preston), Schofield (Stalybridge), Telfer (Warrington), and Holford (Salford), hon. sec. A paper was submitted by Mr. Smith-Saville (borough engineer, Darwen) on the subject of the "Maintenance of the Permanent Way," and an interesting discussion followed its reading. A very successful meeting terminated with hearty votes of thanks to Mr. Smith-Saville and to the chairman.



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THE
# Tramway and Railway World

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**Profitable Uses for Omnibuses as Adjuncts to Tramways.**

Provincial tramway managers visiting London have been struck with the advantages the independent vehicle possesses for the institution of a through service at a high fare on tramway routes. So far as a double-deck conveyance restricted to a speed of 12 miles an hour can be considered to be an express it may be given that appellation, for in the congested central areas of the great towns its mobility will enable it to shake off the denser traffic. As at the most there would only be a half-way stopping place, it would be justifiable to charge the same fare for the half-way and full distances. No difficulty would be experienced in filling the conveyance, and in the winter season the number of such express omnibuses might be augmented by the employment of the vehicles set free owing to the lessened call at that season for their services on routes that during the summer constitute a profitable lengthening of tramway routes. This method would also provide a satisfactory solution of the problem of first-class tramcars, which need to carry ordinary fares on the top deck to render the service profitable. Another remunerative use would be for traffic after theatre performances. Two or three tramcars are often filled up on those occasions, and yet a number of people are left waiting for the following car. With one or two omnibuses in attendance, and bound for residential districts, full loads at a high fare covering all distances would certainly prove profitable. In addition to the motor omnibus enterprises already credited to Birmingham Tramways Committee, there are indications that Liverpool intends to conduct experiments with six additional omnibuses in so dense a traffic centre as the Pierhead, and in linking up the three railway termini, besides giving a service to another suburb. Powers are being applied for by Sheffield Corporation to run omnibuses in an extensive area outside of the city, but it is to be hoped that the enlightened management of the steel capital's tramways will not neglect to add their quota to the interesting reports that should result from the institution of such services as those we have indicated. As a linking-up factor the omnibus already plays a prominent part in both municipal and company tramways, and in the coming session of Parliament powers are to be asked for by 18 towns to adopt this means of locomotion. It is to be desired that they will not confine their selections to the double-deck vehicle, for the single-deck can be profitably used, especially for pleasure trips. Testimony of that fact is afforded by the report presented at the annual meeting of the Isle of Thanet Tramways Company on December 4, when the chairman mentioned that in order to meet the competition from omnibuses the company had hired two single-deck vehicles, which had already returned a profit.

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**Goods Conveyance.**

Two or three causes have combined to direct attention once more to the question of instituting goods traffic on the tramways which link up the great centres of the cotton industry between Manchester and Liverpool. While Liverpool is suffering from the congested condition of its docks, Manchester is a victim to congestion in thoroughfares upon which warehouses abut. In Liverpool the railways have failed to provide adequate means of transport, and even the adoption of motor vehicles by numerous firms, who have taken to heart the lesson of railway strikes, has made little impression upon the holding up of goods, if we may judge by the complaints from traders. Cotton carriers between Oldham and Manchester

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have to some extent adopted motor haulage, and the traffic in that district is so advantaged by the tramway tracks that the manager of the Oldham tramways was moved last year to submit to the local tramways managers' association a suggestion for transferring the traffic to the tramways. The idea of utilising the interurban lines of Lancashire and other counties for merchandise traffic emanated from the late Mr. C. R. Bellamy, then general manager of the Liverpool system, in the presidential address which he delivered to the Municipal Tramways Association in 1904. At that time he was engaged in the preliminary steps for the introduction of a service in the county, but the scheme failed to come to fruition owing to his death. Mr. Bellamy's work, if he had lived, would have interested tramway owners generally, for his idea was to cultivate, in the interests of agriculturists as well as manufacturers, the merchandise traffic provided for by the Tramways Act of 1870. It was for the benefit of the former that the Light Railways Act was passed after the sittings of the Royal Commission on Agricultural Depression in 1895-97. Mr. Bellamy was eloquent in describing how in almost every country but Great Britain light railways had become an essential factor in the prosperity of growers of agricultural, dairy, and general produce, their construction being facilitated by the Governments purchasing land at its agricultural value to enable roadways to be widened for the accommodation of light railways. Since that time we have had the Development Act passed, with the avowed object of providing transport facilities for agriculturists, and particularly for small holders. Yet all that the well-paid Commissioners have accomplished in three years is to appoint a gentleman to report on the question of light railways. Probably greater good would be derived from the Act if the sittings of the Commissioners, like those of the Light Railway Commission, were required to be held locally and in public. The suggestion for a goods service in Lancashire has now been ably elaborated by Mr. C. W. Mallins, the present general manager of the Liverpool tramways. While, as far as the city's existing lines are concerned, Mr. Mallins does not consider it practicable to run more than three or four trains per day, he has worked out plans that provide for additional tramway systems, etc., at an outlay of £273,750, or of a railless trolley car installation at an estimated cost of £190,400. These proposals are set out in full in this issue, and it is satisfactory to note that the chairman of the South Lancashire Tramways Company has expressed his readiness to co-operate in any scheme put forward for the transport of merchandise over his tramways.

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**London Tramway and Omnibus Receipts.**

Party cries have been going up from some of the London daily newspapers about the change which has come over the position of the traffic receipts of the two great competitors, the London County Council Tramways and the London General Omnibus Company. Keeping clear of partisanship, however, the facts are pretty obvious, and reasons can be found for them. Let us take a few figures. For the 13 weeks ended December 28 last year the omnibus receipts amounted to £719,225, being an increase of no less than £230,135 as compared with the corresponding period of the previous year. This increase arose, of course, from the great additions to the number of omnibuses running and to the opening up of additional routes. On January 1 last 40 weeks of the tramway financial year had expired, and the tramway receipts for that period were £1,664,410, being a decrease of £82,820. The tramways were thus suffering from the omnibus competition to the extent of over £2,000 a week. A similar tale was revealed at the end of the 52 weeks on March 26 last, when the total tramway receipts were £2,151,925, a decrease of £104,039. The omnibus company had meanwhile changed their financial year so as to make it begin on January 1, and for the 13 weeks ended March 29 last their receipts were £706,780, being an increase of £194,146. Thus not only had the rate of increase already begun to fall off, but the aggregate for 13 weeks as compared with the 13 immediately preceding was less. Since then there has been further diminution as compared with the corresponding weeks of last year. The aggregate for the 48 weeks ended November 29, at £2,969,665, shows an increase of £505,673. This gives an average increase of about £10,000 per week, most of which was made early in the year. In some recent weeks the increase has been down to between £1,000 and £2,000. This

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simply shows that the expansion from putting on additional omnibuses and opening up new routes has nearly reached its limit. The tramway figures show that the process of winning passengers from the tramways is also over. In the early summer the decreases compared with corresponding weeks began to diminish, but the aggregate decrease continued to grow till for the 17 weeks ended July 30 last the receipts at £731,738 showed a decrease of £23,272. Then the tide turned. Small increases began, and rapidly became larger, till for the 33 weeks ended November 19 the aggregate receipts at £1,406,434 actually showed an increase of £1,130. The increases promise to continue. They are to be attributed in part to the limit on omnibus expansion, but perhaps more to improvement in tramway organisation and traffic arrangements, to reductions in fares, and particularly to the extension of the system of cheap return tickets.

## DONCASTER CARS WITH PECKHAM TRUCKS.

The accompanying illustrations show two new types of cars supplied to Doncaster Corporation, one fitted with the Peckham single-axle radial truck with 13 ft. wheel base, and the other with Peckham 7 ft. 6 in. wheel base pendulum truck. The handsome bodies of the cars were built by the United Electric Car Company, Preston, while the Peckham trucks were made by the Brush Company, Loughborough. The following are the principal dimensions, etc., of the two types of cars:

| | | |
|---|---|---|
| Length over all .. .. .. | 32 ft. 6 in. | 28 ft. |
| Length inside body .. .. | 21 ft. | 16 ft. |
| Width over all .. .. .. | 7 ft. | 7 ft. |
| Width over floor sills .. .. | 6 ft. 1½ in. | 6 ft. 1½ in. |
| Height inside .. .. .. | 6 ft. 4 in. | 6 ft. 4 in. |
| Weight completely equipped .. | 13 tons 1 cwt. | 9 tons 18 cwts. |

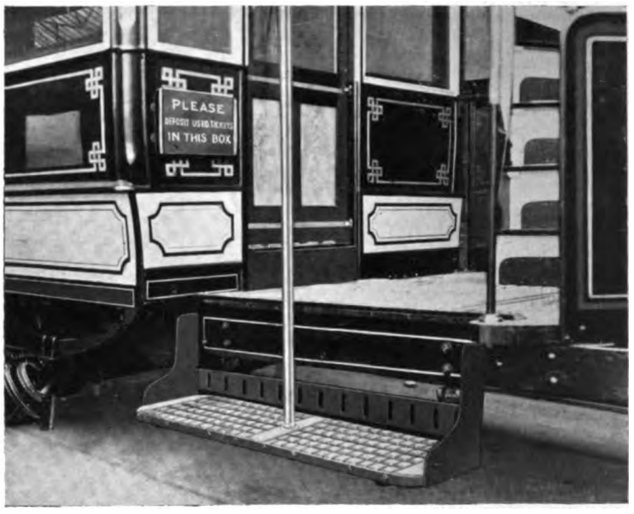
The seating capacity in the one case is 44 on top and 30 inside, total 74; and in the other 36 and 22, total 58. The wheels, which are 32 in. in diameter with 4½ in. axles for radial and 4 in. axles for pendulum trucks, have cast-steel centres and steel tyres. The hand brakes are worked by 20-in. diameter hand wheel, with Peacock's brake windlass gear under the platforms, and electric and track brakes are also provided. The collision fenders are of channel steel 6 in. deep, Hudson and Bowring life-guards are fitted, and the pedal sand boxes have Taylor's patent sanding device. There are two Dick-Kerr 40-H.P. motors per car, regulated by D.B. 1 form K.S. controllers.

The Peckham pendulum and radial trucks are of the same general construction as those supplied to the Southend Corporation, which were described and illustrated in our issue of February 6 last, except that the pendulum trucks are made with solid-forged side frames, and the radial trucks have an improved design of roller bearings and centre gearing that gives a free movement to the radial action of the axles. The special advantage claimed for the radial truck over maximum-traction trucks generally used, and with this length of car, is that it has 35 per cent. greater traction, consumes 30 per cent. less current, supports the car sills for 8 ft. at each end, instead of a 1 ft. centre support provided by centre-bearing maximum traction trucks, and costs 50 per cent. less to maintain.

Mr. E. S. Rayner, borough electrical engineer and tramways manager, says of the operation of these trucks: "The pendulum trucks have proved very satisfactory, the passengers expressing their approval of the comfort of riding on these trucks as compared to the old rigid axle-box type. With regard to the radial truck, it negotiates our curves with ease and returns to the parallel without any trouble."

## USED TICKET BOXES ON CARS.

In these days, when cleanliness and hygiene are made such important factors in public service, it is rather strange that the waste ticket box is not universally in vogue. Not only does it add to the cleanliness and tidiness of the car itself, but of the thoroughfares through which the car passes. Everyone has noticed the state of a busy terminus, littered and made untidy by tickets thrown down by passengers when alighting from the cars. This fact in itself is a good reason for the adoption of suitable receptacles on the cars into which the tickets may be put, but according to data furnished by one of the largest systems in the country,




Ticket Box Fixed to Car.

these ticket boxes have actually become a means of a new source of revenue. We cannot do better than quote from an announcement as to experience in Glasgow which appeared in our issue of February 6, last.

"With a total of nearly 7,000,000 tickets issued in the first week of the new year, little imagination is required to picture the condition of the cars and streets if passengers had not been trained to place used tickets in the boxes provided for that purpose. . . . . When the car reaches the depot at night, the boxes are emptied and the tickets are put into sacks and sold as waste paper to merchants. The yield is from a ton and a quarter to a ton and a half per week, and the proceeds suffice to defray the cost of fixing the ticket deposit boxes to the cars."

The accompanying illustration shows a form of ticket box which is in very successful use on some of the leading systems. Whilst it adequately fulfils its purpose, it is neat, and adds to the appearance of the car. It is made sufficiently shallow so as not to occupy useful space. It is built in mahogany, which in addition to giving good appearance is very strong and durable. The bottom of the box is hinged and fitted with a special form of spring lock with plug key, which can be readily handled by those in authority. The front of the box bears the inscription in gold letters: "Please deposit used tickets in this box." The Equipment and Engineering Company, 2 and 3, Norfolk Street, London, W.C., are the makers of these boxes.

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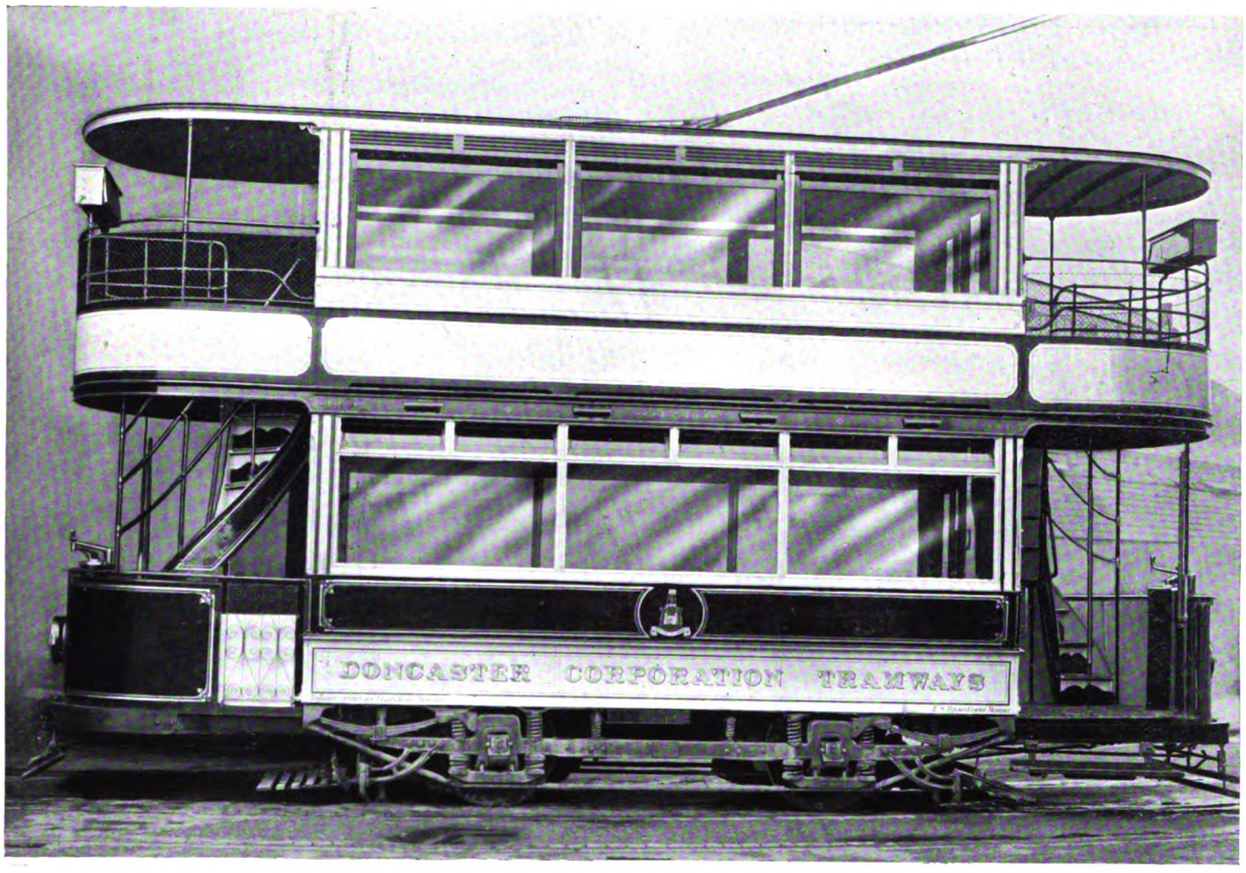
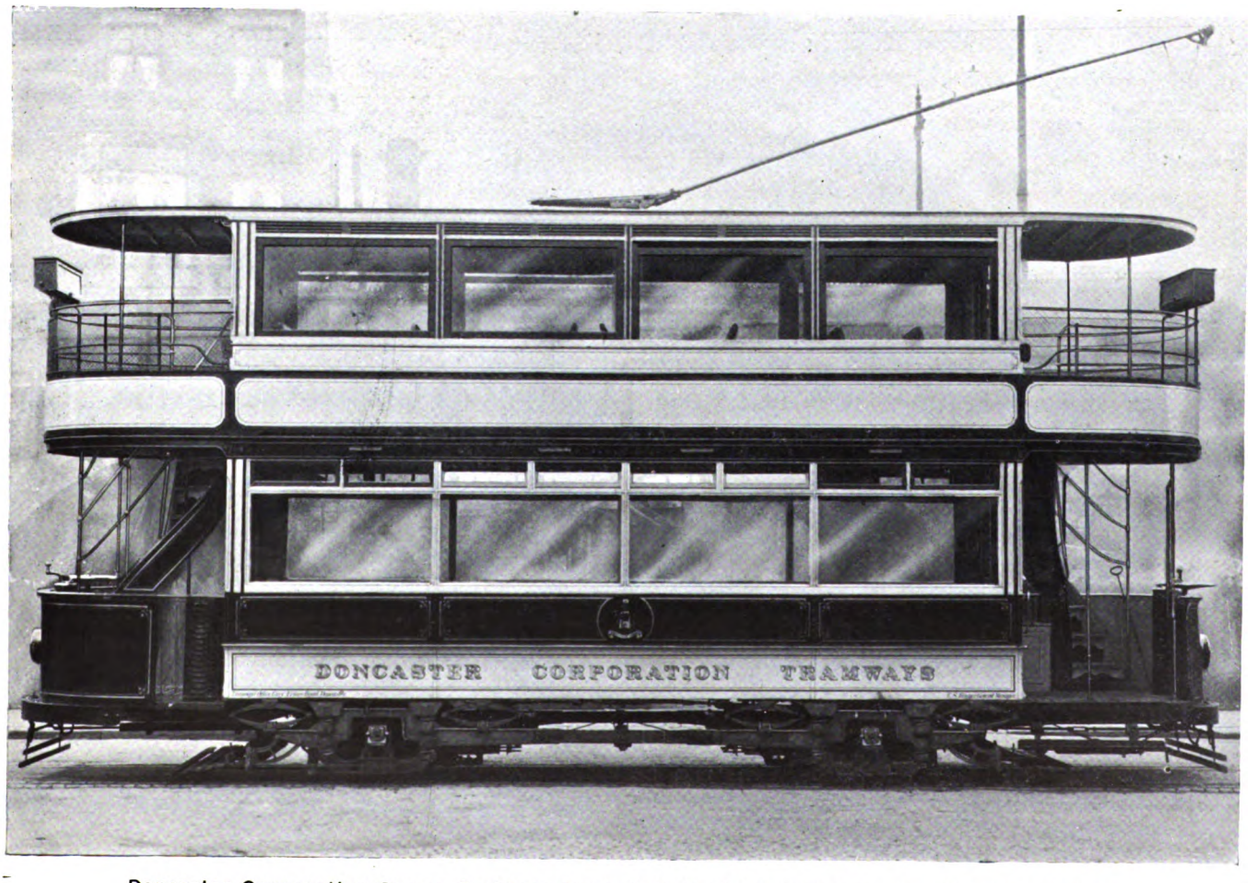



Doncaster Corporation Car on Peckham Pendulum Truck with 7 ft. 6 in. Wheel Base.




Doncaster Corporation Car on Peckham Single-Axle Radial-Axle Truck with 13 ft. Wheel Base.

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## ADJUSTABLE WIND SCREENS FOR TRAMCARS.

With the object of protecting motormen on tramcars from the weather, the Equipment and Engineering Company, of Norfolk Street, Strand, London, have developed a special form of collapsible wind screen which can be easily adapted to cars with open fronts. The appearance of one form is shown in the accompanying illustrations. There are at present three types of these wind screens:

"A" type with three flaps to fold up backwards.
"B" type with four flaps to fold up frontwards.
"C" type with four flaps to fold up backwards.

The screens can, however, be made to suit any special requirements. The "A" type is especially suitable for cars having the destination indicator fixed under the canopy, but where the indicator is situated elsewhere, the space is usually filled in with a board with inscription such as "Circular Route," or "Via Market Place," etc.

The screens have advantages over the vestibule front, inasmuch as they can be folded up out of the way when not required during the summer months and when the cars are inside the depot. Special attention has been paid to the fixing brackets, and the screens can be erected in position by the ordinary tramway staff. They are not only effective and a safe means of protecting motormen on cars with open fronts, but are economical to install, reliable in service, and give a handsome and finished appearance to the car. An important feature of the screens is that they do not obscure the view of the motorman in rain and snow, and are not affected by street lights, as one flap is hinged and its angle is adjustable. When folded the screen is practically invisible.

Wind Screen Folded Up.

Wind Screen Lowered for Use.

## STATUTORY POWERS FOR QUEUES.

Section 30 of the London County Council's Tramways Act, 1912, gives that authority power to make by-laws requiring passengers waiting to board cars at any stopping place or terminus to wait in lines or queues, and to enter the cars in the order in which they stand. The Highway Committee have been in communication with the Home Secretary with a view to the framing of a suitable by-law, and the Home Secretary has now approved a by-law in the form in which the committee have submitted to the Council. This by-law states that on occasions when six or more intending passengers are waiting at any stopping place or terminus they shall form up in a line or queue two abreast, when directed by any officer of the Council, and no person shall take a place in the line out of proper order, or shall enter the tramcar out of the order in which he stands. The penalty is 40s.

**Mumbles Railway Electrification.**—It is understood that the scheme for the electrification of the railway between Swansea and the Mumbles will involve an expenditure of over £50,000. Mr. C. W. G. Little, chief electrical engineer of the British Electrical Federation, Limited, is advising the Swansea Tramways Company in the matter.

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## LONDON AND SOUTH WESTERN RAILWAY
### SUBURBAN LINES ELECTRIFICATION.

THE HIGH-TENSION CABLES.

The contract for the supply and erection of the cables for the electrification of their suburban lines was placed by the London and South Western Railway Company with Messrs. Siemens Brothers and Company, Limited, Woolwich. The leading particulars are as follow:

Section of L. & S. W. Cable.

The three-phase current has a working pressure of 11,000 volts at a frequency of 25 cycles per second. The generating station is to be at Wimbledon, and sub-stations containing transformers and rotary converters are to be erected at Waterloo, Clapham Junction, Raynes Park, Hampton Court Junction, Barnes, Twickenham, Isleworth, Sunbury, and Kingston. The cables (Fig. 1) are three-core, paper-insulated, lead-covered, jute-served, and armoured with a layer of galvanised steel wires and served all over with jute.

The approximate quantities of three-core cable to be used are as follow:

34 miles 0·2 square inch.
21½ „ 0·15 „ „
19 „ 0·06 „ „

The chief particulars of the cables are as follow:

| Section. | No. of Wires. | Diameter of Wire varying from | Thickness of Dielectric between Conductors and between any Conductor and Lead. | Thickness of Lead. | Overall Diameter of Cable. |
|---|---|---|---|---|---|
| Sq. In. | | | Inches. | Inches. | Inches. |
| 0·2 | 33 | 0·06 to 0·114 | 0·36 | 0·16 | 3·17 |
| 0·15 | 33 | 0·054 to 0·11 | 0·36 | 0·15 | 3·01 |
| 0·06 | 22 | 0·048 to 0·068 | 0·35 | 0·13 | 2·65 |

The cables are being erected on brackets supported by stakes driven in the ground. They were subjected to a test pressure of 25,000 volts between any core and lead. The work is being carried out under the superintendence of Mr. Herbert Jones, M.I.E.E., chief electrical engineer to the London and South Western Railway Company.

Fig. 2 illustrates the first batch of finished cable before dispatch from Woolwich Works.

## TRAMCAR AND OMNIBUS INSPECTION.

In the report of the Commissioner of Police of the Metropolis for the year 1912, issued on October 31, it is stated that 249 motor omnibuses were rejected during the year by the Noise Committee, the vehicles not coming up to the standard required in respect to quiet running. Most of them, after the necessary alterations had been made, were subsequently brought up to the requisite standard and passed. The number of cases and the class of vehicles reported for being unduly noisy after being licensed during 1912 were: Motor omnibuses, 7,677; electric tramway cars, 2,684; and motor cabs, 353; a total of 10,714. This, compared with 1911, shows on the whole a slight decrease, motor omnibuses being 775 less, whilst electric tramway cars increased by 462 and motor cabs by 128.

The total number of licences issued for cabs and stage carriages during 1912 exceeded those issued in 1911 by 81, the numbers for 1911

Siemens' Cables for the London and South Western Railway.

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and 1912 respectively being 16,476 and 16,557. Of this number, horse-drawn carriages again show a decrease, being 1,402 less than in 1911. This decrease is made up of 487 hansoms, 475 four-wheeled cabs, 410 horse-drawn omnibuses, and 30 horse-drawn tramway cars. Against these decreases must, however, be set a total increase of 1,483 in mechanically-propelled vehicles, made up of 343 motor cabs, 946 motor omnibuses, and 194 electric tramway cars.

The increase in the number of motor omnibuses is referred to as showing "that the popularity of this class of vehicle has by no means decreased. This continuance of popularity may also be due to the fact that many extensions of route have been made to places of resort in the outer part of the metropolis." Among the carriages licensed in 1912 there were 2,363 new vehicles, of which only three were horse drawn, the remainder being mechanically-propelled. The number of taximeters tested during the year was 24,623, of which 437 were rejected as being unfit from various causes.

Vehicles of all kinds killed 538 persons in the street—over a hundred more than in 1911. Of these, 331 were victims of motor vehicles of various kinds, the deaths of 167 being attributed to the motor omnibus. Tramcars were responsible for 37 deaths. Motor vehicles of all kinds injured 8,636 people, the motor omnibus being responsible for 2,580. The total number of persons injured by tramcars was less in 1912 than in 1911, while the number injured by motor omnibuses was doubled in the same period. Of the 538 killed in the streets, 273 were between the ages of 15 and 60.

## SUCCESS OF P-A-Y-E CARS AT ABERDEEN.

A Report Presented to the Aberdeen Tramways Committee by Mr. R. S. Pilcher, General Manager.

Gentlemen,—I beg to submit the following report on the P-A-Y-E cars which have been in use on the Woodside route since April 28—a period of 21 weeks. The Woodside route—on which the new cars have been on trial—is the busiest route the department operates, the revenue is the highest, and the passengers per car-mile are the highest (excepting only the Beach route). The city terminus of this route is the heaviest loading station for any one route on the system, so that it may be said that the P-A-Y-E system has been tried on that route which offers the severest conditions.

The objects of the P-A-Y-E system of car operation may be briefly stated as follow:

(1) To retain the conductor on the rear platform in order to assist passengers on and off the cars, to look out for intending passengers, and to prevent accidents to persons wishing to board and alight from the cars whilst in motion.

(2) To improve the regulation of traffic by the introduction of a separate entrance and exit, and to enable an additional front exit to be used.

(3) To enable the conductor to collect all his fares.

The success of any new system of car operation is influenced very largely by the attitude of the travelling public towards it. To operate P-A-Y-E cars successfully, it is necessary for the public to assist the department by having their fares ready on entering the car. I have found that the public have responded very willingly, and passengers have their fares ready before entering the cars. There has been a certain amount of criticism, which is only to be expected with any new system, but this criticism has been directed more to the details of the car, which can be remedied, than against the general principle of the P-A-Y-E system. The department has experienced no difficulty with giving change for silver. On the ordinary cars the amount of silver to be changed is 10 per cent., but this has dropped to below 5 per cent. on the Woodside cars.

With regard to the loading of cars at a busy terminus, or for any special event, the P-A-Y-E cars will, no doubt, take slightly longer to load, but these cars will save time at every stopping place *en route*, partly by the use of the front exit, and also by the prompt starting signal which the conductor is able to give the motorman from his position on the rear platform. I am able to give you the average time occupied by the complete trip on two Fridays—one on the old system and the other on the P-A-Y-E system—showing an advantage in favour of the P-A-Y-E cars, although the number of passengers carried and revenue earned was higher, thus causing more stoppages on the P-A-Y-E cars:

| | Date. | Market Day. | Average Running per Journey between 2-0 and 5-30 p.m. | Passengers per Car-Mile. | Receipts per Car Mile. | Total Receipts for the Day. |
|---|---|---|---|---|---|---|
| | | | | | d. | £ s. d. |
| Ordinary system ... | Mar. 14 | Friday | 35·1 min. | 11·42 | 10·8 | 45 16 8 |
| "P-A-Y-E" system | May 16 | Friday | 34·2 min. | 12·41 | 11·66 | 49 18 2 |

The question of accidents is one of great importance to a tramway system. It is not only the amount of compensation, but the question of safe conveyance for the public. Arrangements should be made, where possible, to prevent accidents. During last year the number of accidents reported on the system was 309, of which the greater number were of persons either attempting to board the cars, or alighting, whilst the car was in motion. In some cases the conductor was there to allay the seriousness of the accident, but in many cases he was engaged collecting the fares, inside or on the top of the car. For your information, I enclose a copy of a typical accident of this kind, from which you will see that the passenger fell off the car and was not even seen by the conductor. Such accidents are impossible with the P-A-Y-E system. The motorman does not open the front gate until the car is at a standstill, and the conductor prevents persons alighting from the rear platform until the car has stopped. During the period of trial two accidents have been reported owing to persons jumping off the rear platform whilst the car was in motion; both of these would have been more serious had the conductor not endeavoured to prevent them. During the same period last year, with the ordinary cars in use, seven accidents were reported of the same type. If all the department's cars were operated on this principle, one can imagine the reduction in this type of accident which would take place.

The prepayment of fares has a direct influence on the finances. Any person who studies the conditions of present-day tramway traffic must prove to himself that a conductor—no matter how conscientious he may be—cannot collect all the fares and attend to his other numerous duties.

I have kept the committee informed, by the weekly traffic returns, of the progress of the P-A-Y-E receipts. The total increase for the 21 weeks is £487 0s. 6d., an average of £23 3s. 10d. per week. During this time 4,804·8 more miles have been run. I should have been quite prepared for a decrease in receipts per car-mile owing to this, but the receipts per car-mile have increased from 11·3d. in the same period last year to 11·7d. this year. A great deal of the extra revenue is due to the prepayment of fares, and to the fact that the conductor is in a better position to see all intending passengers.

During the past five months I have given close personal observation to the P-A-Y-E cars. These cars have had to deal with the Agricultural Show traffic, on which day the ordinary cars were, in some cases, too crowded to collect all the fares, whereas the P-A-Y-E cars required no checking; and on another occasion—that of the "Timmer Market"—thousands of children were carried without any delay, whereas the cars on other routes were, in many cases, running late.

I have no hesitation in recommending the P-A-Y-E cars to the committee as an improved method of tramway operation by which greater public safety can be obtained.

The number of P-A-Y-E cars in operation on the Woodside route at present is 11, leaving 47 top-covered cars of the ordinary type. The cost of altering this type of car would be £30 each; the cost of altering the open cars would be considerably less than this.

Should the committee decide to adopt the P-A-Y-E system on all the routes, the cost of alteration would be spread over several years, the time required for alteration being from two to three weeks, and as each car is altered its earning capacity will be increased.

On the last car altered a considerable improvement has been made on the stairway, which is now easier to mount than any of the ordinary cars. The top-deck arrangement of screen has also been improved so as to allow an easier exit for passengers.

## ABERDEEN CORPORATION TRAMWAYS.

### Accident Form.

Every case of injury to person, damage to property, vehicles, etc., must be reported to the general manager at the earliest possible moment. It must be written in ink, and signed by the driver and conductor. Full information and the names and addresses of witnesses must be given in every case, failing which, the driver and conductor will be held equally responsible for damages, etc.

No. of Accident—3,314.

Day—Thursday; date—1st May; time—2-20 p.m.

| | |
|---|---|
| Motorman's name ... ... ... ... ... | George Low. |
| Conductor's name ... ... ... ... ... | John Paterson. |
| Car No. ... ... ... ... ... ... | 42. |
| Was the car gong sounded? ... ... ... ... | — |
| Speed of Car ... ... ... ... ... ... | 6-7 miles per hour. |
| Condition of rails ... ... ... ... ... | — |
| Exact place where accident occurred ... ... | 350, King Street. |
| Where was the car going? ... ... ... ... | Bridge of Dee. |
| Name of person injured ... ... ... ... | Mr. Wm. McDonald. |
| Address ... ... ... ... ... ... ... | 404, George Street. |
| Particulars of injury ... ... ... ... ... | — |
| Property damaged ... ... ... ... ... | — |
| Particulars of damage ... ... ... ... | — |
| Name and address of owner of property... ... | — |
| Name and address of witnesses ... ... ... | No witnesses. |

### Full Statement of what Happened.

While Car No. 42 was proceeding along King Street towards Castle Street, a passenger attempted to leave the car while in motion and fell. I did not see the accident, nor knew anything about it, as I was on top-deck collecting my fares. A policeman informed me about the accident an hour after. I remember three passengers who travelled inside the car that journey from Merkland Road, and they did not see the accident.

*Driver's Signature*, George Low.

*Conductor's Signature*, John Paterson,

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# CONVEYANCE OF GOODS ON LIVERPOOL AND CONNECTING TRAMWAYS.*

By Mr. C. W. Mallins
(*General Manager of the Liverpool Corporation Tramways*).

There is no precedent in this country for the adoption of goods service on tramways, as none of the British tramway authorities have attempted to utilise their systems to any great extent for such a purpose. The question, however, appears to be of such vital importance to the trade of the port and the city of Liverpool that every effort possible should be made to increase the transport facilities, particularly bearing in mind the difficulties which the mercantile community are at present experiencing in connection with the transport of merchandise. A cheap and expeditious system would, undoubtedly, prove a great advantage to the whole community, and might possibly encourage even a greater volume of trade to the port.

One cannot survey the whole aspect of the traffic problem at the Liverpool docks to-day without being amazed at the wonderful increase in the tonnage entering and leaving the port as compared with 30 years ago, at which period the Alexandra and other docks were opened for public traffic at the north end of the city, giving ample facilities for dealing with the shipping of the port at that time. In the year 1882 the tonnage entering and leaving the port of Liverpool amounted to 16,208,272 tons, whilst in 1912 it had risen to 34,654,830, or an increase of 113 per cent. in 30 years. The land transport facilities of 30 years ago have been considered ample, but the great development in steamship construction, both as regards speed and carrying capacity, of late years appears to have overwhelmed the resources of the transport facilities, causing the present congestion at the docks and stations. The great carrying companies find themselves unable to cope satisfactorily with the ever-increasing dock traffic, and it therefore follows that, if the Liverpool tramway system could be made to assist in dealing with this congestion, it would indeed play a useful part, and the railway companies would appreciate such assistance, because, after all, the tramways should become a very useful adjunct to the railways.

The traffic congestion problem as it stands at present may be divided under two heads:

(1) *Local Traffic between Docks and Railway Stations and Warehouses.*—A great portion of this traffic is dealt with by horse traction, entailing the use of a very large number of vehicles, which must necessarily be of small carrying capacity, and can only move at a slow rate, and consequently increase the congestion on the limited quay space and roads adjacent to the docks and stations. In 1912 the number of horse vehicles is given as 11,000, and mechanically propelled vehicles, 124, in addition to the line of dock railway which operates between the dock quays and railway stations. Even making due allowance for the greater carrying capacity and mobility of the 124 mechanically-propelled vehicles, the local transport accommodation can hardly be said to have kept pace with the increasing trade in the latter years of the period under review. Hence the present congestion, although no one would for one moment attempt to minimise the great service rendered to the commerce of the port and city by the forwarding agents and master carters with their admirable system of animal traction—no doubt the finest of its kind in the world—but the scientific development and rapid flow of the tide of progress of the twentieth century must surely render obsolete even the best system of animal traction. The general manager is of opinion that, if a thoroughly well organised system, equipped with the most modern type of mechanically-propelled vehicles—possibly of the electric storage battery type, with a cheap power supply—were provided to deal with the work now carried out by the horse vehicles, the work could be performed by 50 per cent. fewer vehicles, which would materially lessen the congestion, and it is reasonable to assume that the work would be carried out at a much lower cost, thus solving the local portion of the problem. The general manager, however, does not consider it necessary to enter into the details of a scheme on these lines, as, no doubt this suggestion will have the consideration of those responsible in the matter.

(2) *The Transport of Merchandise between the Docks and the Manufacturing Centres.*—The facilities offered by the railway companies do not appear to be adequate for the requirements, as it is alleged that delays frequently occur in transit causing serious inconvenience and consequent loss, and, in addition, the rates charged are considered excessive, but the greatest difficulty appears to arise from the slow delivery of the goods. The railway companies seem to experience much difficulty in dealing cheaply and expeditiously with the great volume of trade which the country is now happily experiencing. The facilities, so far as the port of Liverpool is concerned, do not appear to have been increased in the same ratio as the trade, which probably accounts for the present congestion.

Through the courtesy of an old and highly-esteemed firm of cotton merchants, the general manager is able to furnish the following rate charged per ton for the conveyance of both American and Egyptian cotton between the Liverpool Docks and Bolton, Lancashire, a distance of 32 miles, viz., 8s. 4d. per ton, exclusive of all terminal charges, which works out at 3¼d. per ton-mile. The charges for the transport of other merchandise vary according to the class of goods.

Having regard to the foregoing facts, it is not surprising that the merchants and traders are anxious to discover a cheaper and more expeditious system of transport, and naturally look to the tramways in order to ascertain whether the system could be utilised for the purpose. The general manager is not unmindful of the great advantages to be derived from the establishment of a cheap and expeditious system of transport for goods, nor is he oblivious to the difficulties which would have to be surmounted before such a system could be brought into operation. The first consideration must necessarily be as to what facilities the Mersey Docks and Harbour Board are prepared to grant to enable any new system of transport to enter the dock estate, which is undoubtedly the key of the position so far as the solution of the docks traffic problem is concerned.

With regard to the question of utilising the existing tramways for the conveyance of goods, the general manager has carefully considered the subject, and he is of opinion that it is quite impracticable to operate a goods service of any magnitude over the existing lines. The Knotty Ash and Pier Head route is the only one which has a connection with tramways outside the Liverpool system, and the general manager would point out that the passenger traffic on this route is very heavy, necessitating a very frequent service of cars between the hours of 4-30 a.m. and 12-30 midnight. At the maximum time of traffic, cars run at intervals of every 1½ minutes, and at the minimum every four minutes. It will therefore be seen that it would be quite impossible to operate a goods service over this route in addition to the passenger service before mentioned, except for a limited number of hours in the early morning, and the fact must not be overlooked that repairs have to be carried out, both to the track and overhead equipment, during these hours. In the opinion of the general manager it would be quite impracticable to attempt to utilise any of the existing lines in the central area of the city for the transport of merchandise on any considerable scale, as they are at present taxed to their utmost capacity in dealing with the passenger traffic, which is every day becoming a more pressing problem, and one which it will be necessary for the committee to seriously consider in the not distant future. The general manager would therefore point out that the most that could be done with the existing lines would be to try a system of goods transport tentatively on a very limited scale, say three or four trains per day, entailing a comparatively small capital expenditure, and, if found successful, a more elaborate system could be established on the following lines, provided that the Mersey Docks and Harbour Board, and the Bootle Corporation are prepared to grant the necessary facilities, and further, that the merchants and shippers give their full support to the scheme, by guaranteeing a traffic of at least 1,314,000 tons of merchandise per annum from and to the docks, at, say, 2¾d. per ton-mile by the new system, exclusive of terminal charges, providing a revenue amounting to £105,394 per annum, which would cover the operating expenses and standing charges, and also reserve, renewal, and depreciation, and allow a reasonable margin for other contingencies. It is quite probable that a considerable volume of mineral traffic and farm produce would be transported by the new system, which would materially help in securing the necessary guarantee to cover the charges before referred to.

The permission of the Mersey Docks and Harbour Board to electrify the dock railway, with the necessary connections, as shown on the accompanying plan marked "A," section 1, would have to be obtained, the total length of which is 22 miles single line, and the approximate cost £154,000. In this connection it might be considered desirable to lower the level of the portions of the railway abutting on the approaches to the landing stage, from the street level to a shallow tube, and by that means obviate a great deal of the obstruction that now takes place in connection with the operation of the railway, the cost of which is *not* included in these estimates.

In the alternative, if it were considered impracticable to electrify the dock railway, the construction of a line of tramways parallel with the railway, outside of the dock estate, in the public streets, with the necessary connections to the dock estate, and as shown on the accompanying plan, marked "A," section 2, the total length of which is about 22½ miles single line, and the approximate cost £157,500.

The construction of a tramway to deal with the North Docks traffic, between Alexandra Dock and Knotty Ash terminus, as shown on the accompanying plan marked "A," section 3, would also be necessary, the length of which is about 7¾ miles single line, including passing places, and the cost would approximately be £54,250. The consent of the Bootle Corporation would, of course, be necessary before this line could be constructed.

The construction of a tramway for the purpose of dealing with the South Docks traffic between Brunswick Dock and Knotty Ash terminus would also be necessary, as shown on the accompanying plan marked "A," section 4, the length of which is about five miles single line, including passing places, and would cost approximately £35,000.

With these connections it would be possible to operate a service of

* A report presented to the Tramways and Electric Power and Lighting Committee of Liverpool Corporation.



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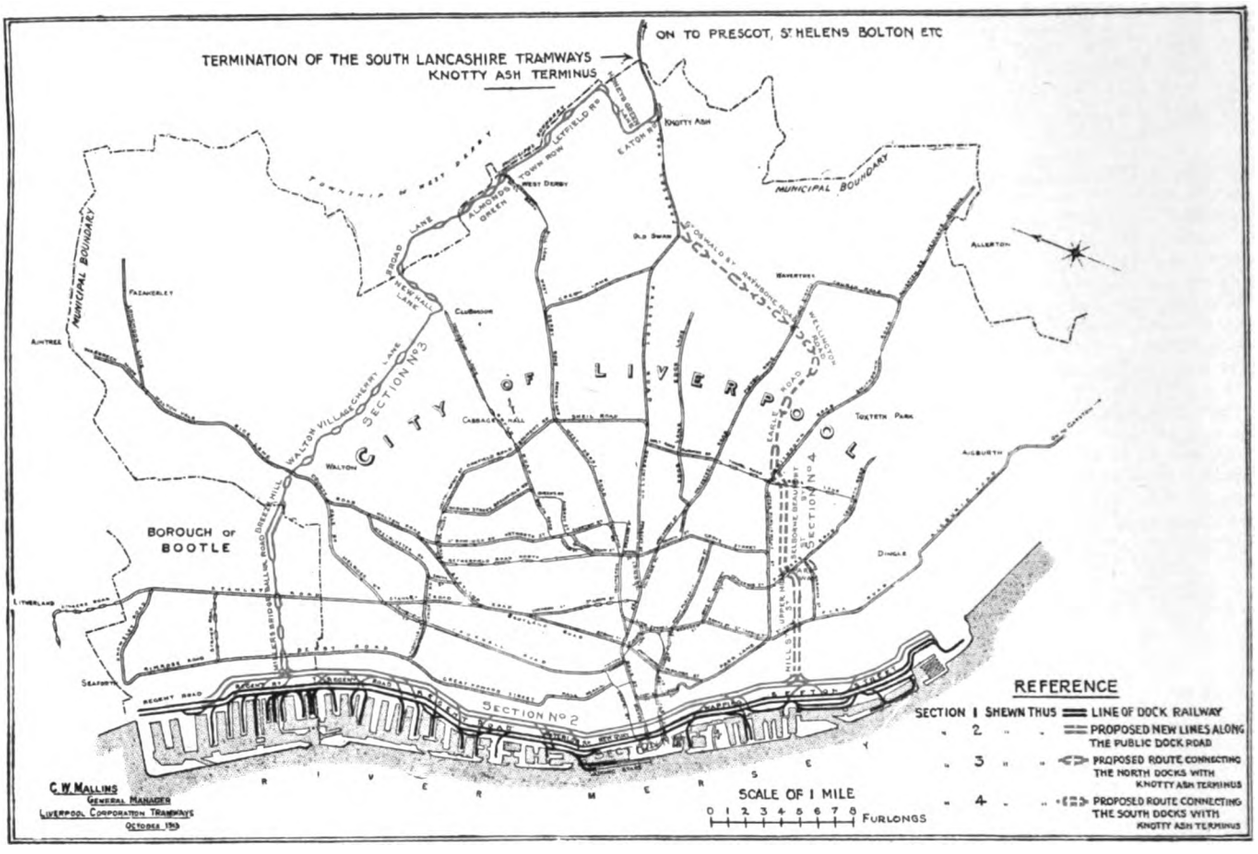
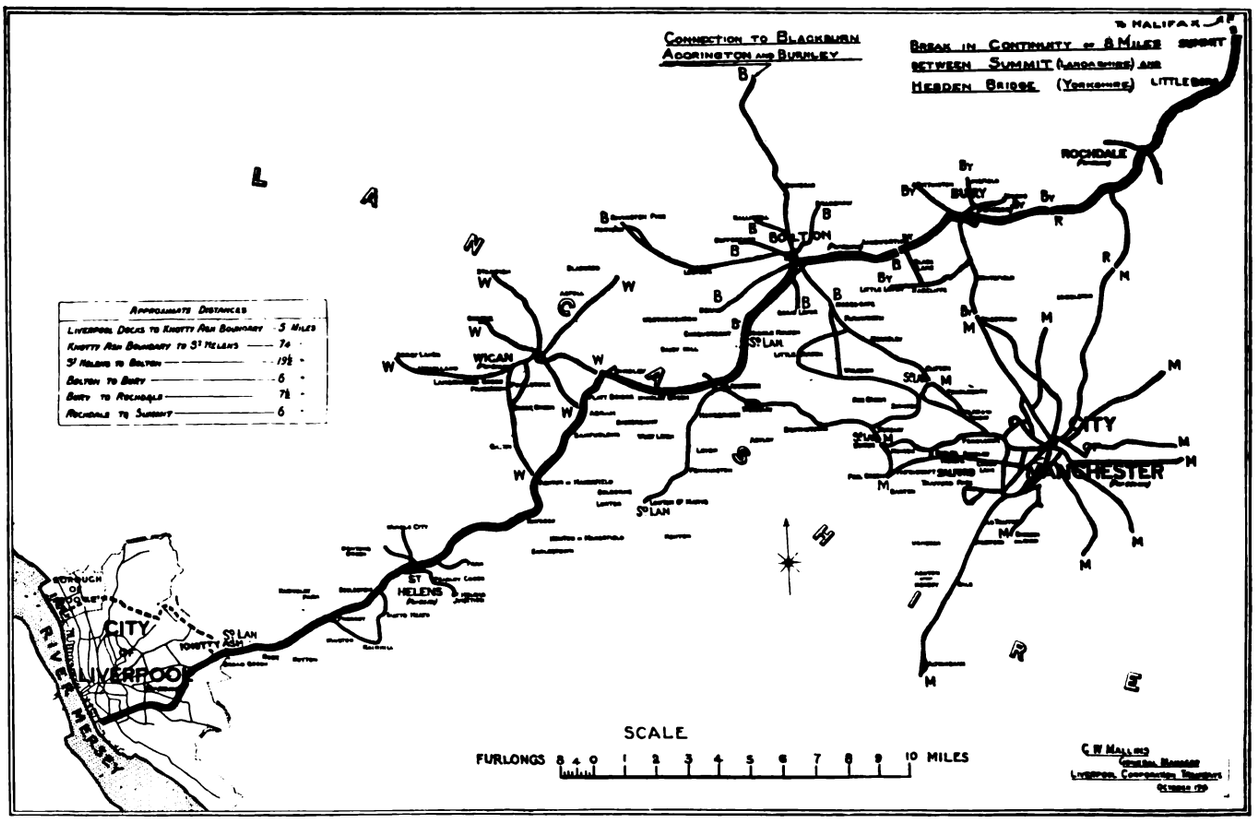

TERMINATION OF THE SOUTH LANCASHIRE TRAMWAYS
KNOTTY ASH TERMINUS
ON TO PRESCOT, ST HELENS BOLTON ETC
MUNICIPAL BOUNDARY
CITY OF LIVERPOOL
BOROUGH OF BOOTLE
SECTION No 1
SECTION No 2
SECTION No 3
SECTION No 4
REFERENCE
SECTION 1 SHEWN THUS — LINE OF DOCK RAILWAY
" 2 " " — PROPOSED NEW LINES ALONG THE PUBLIC DOCK ROAD
" 3 " " <> PROPOSED ROUTE CONNECTING THE NORTH DOCKS WITH KNOTTY ASH TERMINUS
" 4 " " <> PROPOSED ROUTE CONNECTING THE SOUTH DOCKS WITH KNOTTY ASH TERMINUS
SCALE OF 1 MILE
0 1 2 3 4 5 6 7 8 FURLONGS
C. W. MALLINS
GENERAL MANAGER
LIVERPOOL CORPORATION TRAMWAYS
OCTOBER 1913

Proposed Routes for Conveyance of Goods by Tramway in Liverpool (Plan A).




Liverpool Tramways and Connections (Plan B).

CONVEYANCE OF GOODS ON LIVERPOOL AND CONNECTING TRAMWAYS.

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trains, consisting of one motor and two trailer wagons, for which the Board of Trade would be prepared to grant provisional authority. These trains would have a total carrying capacity of 25 tons each, and would run at intervals of every 10 minutes on each of the branch lines, making a total of 288 trains per day, capable of conveying 7,200 tons of goods, or a total of 2,628,000 tons per annum to the city boundary. In order to equip these lines to their full capacity the following would be the appoximate rolling stock necessary: 36 motor vehicles and 72 trailer wagons, but as the South Lancashire Tramways Company's system is only capable of dealing with about 144 trains per day, it would not be necessary to purchase the whole of the rolling stock until the company increased the capacity of their system, which the general manager is given to understand they are prepared to do if the result of an experiment warranted the expenditure. 14 motor vehicles and 28 trailer wagons would be capable of conveying 3,600 tons per day, or 1,314,000 tons per annum, and, with spares, would cost approximately £22,000. This instalment of rolling stock would be sufficient to establish the system and could be increased as traffic developed. In order to provide the necessary shed accommodation, another £5,000 must be added. The South Lancashire Tramways Company and other undertakings would, of course, provide their own portion of the rolling stock. Adding these latter sums for rolling stock and shed accommodation to the sums already mentioned for the construction of lines, the total capital expenditure would amount to £273,750, and an annual sum of £90,655 would be required for operating costs and standing charges, and reasonable allowance for renewal and depreciation, viz.:

ESTIMATES OF ANNUAL EXPENDITURE AND INCOME

(based upon the minimum working of 144 trains per day).

| | £ |
|---|---|
| *Traffic:* | |
| Superintendence | 600 |
| Wages of motormen, conductors, and other employees | 9,000 |
| Cleaning and oiling vehicles | 1,424 |
| Cleaning and sanding track | 250 |
| Fuel, lighting, and water for depots | 200 |
| Uniform for employees | 500 |
| Miscellaneous charges | 1,000 |
| | £12,974 |
| *General Charges:* | |
| Permanent way | 9,000 |
| Electrical equipment | 1,500 |
| Buildings and fixtures | 120 |
| Workshop and tools | 50 |
| Motor and trailer wagons | 2,280 |
| Power expenses | 20,000 |
| General and management expenses (including rates and taxes) | 5,000 |
| Interest and sinking fund | 17,800 |
| Renewal and depreciation | 13,690 |
| | £82,414 |
| Add 10 per cent. for contingencies | 8,241 |
| Compensation and law charges (not ascertainable) | |
| Total estimated expenditure | 90,655 |
| Total estimated revenue | 105,394 |
| Balance | £14,739 |

The above-mentioned sum for capital expenditure is exclusive of the cost of counting-house facilities, which would certainly be necessary if the system were carried out on a large scale, and the provision of a gridiron at the city boundary, Knotty Ash, where the goods trains would be taken over by the South Lancashire Tramways Company.

The general manager has gone carefully into the question of running a service in conjunction with the South Lancashire tramways, which undertaking has connection with several Lancashire towns, as shown on the accompanying plan marked "B," and by building a certain length of tramways, connection could be established with several Yorkshire towns, which, like many of those in Lancashire, are connected by various tramway systems. Unfortunately, if ordinary tramways were adopted, in some of the systems the track is not of the standard gauge, but this difficulty could be surmounted by certain mechanical arrangements. If the trackless system was adopted, however, this difficulty would not exist. The chairman of the South Lancashire Tramways and the Prescot Light Railway (the Hon. Arthur Stanley, M.P.), at a recent interview with the chairman and deputy-chairman and general manager, stated that he would be prepared to co-operate with the committee in any scheme they might bring forward for the transport of merchandise over his system.

From the foregoing figures it is quite obvious that to introduce a system of any magnitude for the transport of merchandise by ordinary tramways would involve a large sum in capital expenditure, in order to construct and equip the necessary lines, and having regard to this fact the general manager thought it desirable to consider the practicability of the trackless trolley system as an alternative, although, like the ordinary tramways, this system has not been adopted to any extent in this country for the conveyance of goods, but after some enquiry into the matter, he is informed by certain of the promoters of the trackless trolley system that it is quite practicable for the transport of goods, and could be established at a cost of £1,700 per route mile, including all charges other than rolling stock, as compared with £7,000 per mile of single track for ordinary tramways, or a total sum of £40,800 for the construction of the 24 route miles required, as compared with £246,750 for the same length of ordinary tramways. Before the system could be established, however, it would be necessary to obtain Parliamentary powers, which would involve certain further expenditure. This, together with other charges, would amount to, say, another £4,000, or a total of £44,800, and in order to equip the lines with the necessary rolling stock to convey the quantity of merchandise necessary to cover the operating costs and standing charges for the first instalment 24 trains would be required, costing £1,900 each, or a total of £45,600, with an additional sum of £10,000 for spare trucks and shed accommodation. Adding this sum to the amount already mentioned for the erection of overhead lines and other equipment would make a total of £100,400, with an annual sum of £78,136 for operating costs and standing charges, also renewal and depreciation, and in order to safely provide this sum, it would be necessary to have a guarantee from the merchants and shippers that they would be prepared to transport 1,314,000 tons from and to the docks at, say, 2½d. per ton-mile, exclusive of terminal charges, amounting to £95,812. This extremely cheap rate per ton-mile is possible owing to the comparatively small capital expenditure necessary to establish the trackless system.

So far as the general manager has been able to ascertain, the operating costs and standing charges would be as follow, viz.:

TRACKLESS TROLLEY SYSTEM.

ESTIMATES OF ANNUAL EXPENDITURE AND INCOME.

| | £ |
|---|---|
| *Traffic:* | |
| Superintendence | 600 |
| Wages of motormen, conductors, and other employees | 10,850 |
| Cleaning and oiling vehicles | 1,640 |
| Fuel, light, and water for depots | 200 |
| Uniform of employees | 550 |
| Miscellaneous charges | 1,000 |
| | £14,840 |
| *General Charges:* | |
| Electrical equipment | 1,500 |
| Buildings and fixtures | 120 |
| Workshop and tools | 50 |
| Maintenance of vehicles (steel tyres) | 11,169 |
| Power expenses | 20,000 |
| General and management expenses (including rates and taxes) | 5,000 |
| Interest and sinking fund | 10,322 |
| Renewal and depreciation | 8,032 |
| | £71,033 |
| Add 10 per cent. for contingencies | 7,103 |
| Compensation and law charges (not ascertainable) | |
| Total estimated expenditure | 78,136 |
| Total estimated revenue | 95,812 |
| Balance | £17,676 |

The tonnage mentioned above would be required to cover standing charges and operating expenses, but the system would be capable of dealing with 2,628,000 tons per annum, equal at 2½d. per ton-mile to £191,625 per annum, which would make it extremely cheap to the merchants and profitable to the operators.

On making a comparison between the cost of constructing an ordinary tramway and the trackless trolley system, it becomes quite clear that the latter system is infinitely cheaper to construct, and if the statements made by the promoters are correct, would be found equally as efficient for the purpose, and would possibly prove more flexible in dealing with the problem before the committee, but before the general manager could recommend the system, he would require the promoters to demonstrate to his satisfaction the practicability of the system in actual working.

The whole of the figures quoted in this report are approximate, but ample provision is made to cover every item of expense mentioned.

The general manager has not included the cost of collecting and distributing depots, as he does not consider them necessary in connection with the Liverpool portion of the scheme, as this would only deal with the traffic between the docks and the city boundary at Knotty Ash, where, if the scheme developed, a gridiron and sorting depot would be necessary as before referred to. No doubt collecting and distributing depots would be necessary for the other tramway undertakings, who would deal with the traffic beyond the Liverpool boundary.

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# COMPOUND GUARD RAILS FOR CURVES.*

By M. Janillon

(*Chief Engineer of Permanent Way and Construction, Compagnie Générale Parisienne de Tramways*)

and M. Le Bris

(*Chief Engineer of Technical Services, Compagnie Générale Française de Tramways*).

The wear of rails on curves of short radii at certain places where the traffic is heavy is so severe that these rails have to be replaced after an extremely short life. The sections reproduced in Fig. 1 show the deformation of rails in from 12 to 18 months only. The inside rail, owing to its position and to the thinness of the lip or check, is first worn out. On certain curves this lip became so thin that it suddenly bent over, and derailment occurred. These sections show that the tread of these rails is comparatively but little worn. Moreover, attempts have been made to prolong their life by reducing the gauge. This resulted in such serious wear of the outer rail that it had to be renewed after an unusually short time. In addition to the danger of derailment, the rapid wear of the curves entails heavy expense, viz. :

1. The renewal of the rails and the repairs of the roadway (which in certain cases is extremely costly).
2. The packing, which has to be done to the seat of the rails. This must be carried out properly and without interruption of the services, and almost always without temporary tracks.

In order to remedy these disadvantages, the Commission which inquired into the matter on behalf of the Tramways and Light Railways Union of France, proposed to the committee of the Union that a special rail should be used with a lip slightly reinforced. This arrangement, which affords certain advantages, can, however, only be considered a temporary expedient. On curves under heavy traffic it does not form a complete and final solution of the question. In the majority of cases this would appear to be found in the use of a special rail fixed on the convex side of the inner rail—the part of the rail which serves to guide the car, and is consequently rapidly worn out—which could be replaced after a certain degree of use in order to protect the outer rail; or be easily replaced when worn out and useless.

Other considerations must be taken into account; for instance, it is indispensable that the special rail should be as similar as possible to the normal rail, particularly in the following points:

(*a*) in form of tread;

(*b*) in its attachment either to the foundation or to the main rail;

(*c*) in the general lay out of the road;

(*d*) in its fitting adjacent rails, by means of the ordinary fish plates, so as to avoid the use of special fish plates, which are often unsatisfactory.

* A report presented by a Commission of the General Technical Conference of the Tramways and Light Railways Union of France, and adopted by the Union. The members of the Commission were as follow: M. Resal (president), MM. Broca and Holtzen (vice-presidents), MM. Bacqueyrisse, Conchaudon, Delavergnas, Domblides, Finn, Gadot, Janillon, and Le Bris.

On the other hand, it is indispensable that the piece which wears out should be also as small as possible, in order to reduce to the minimum the expense of renewal. It is evident that the piece, being reduced to the minimum, should be of the best metal, in order to minimise the expense of removal and replacement.

Finally, it is indispensable that the work of shifting or renewal of the movable pieces should be effected without the slightest change in the seat of the rail. From these considerations it may be concluded that the special rail for curves must be formed of two pieces, the supporting part immovable, and the renewable piece of small dimensions easily replaced and fixed upon the first. The immovable piece supports the weight of the cars; the other, which serves as a guide, supports only the lateral thrust, but it must in addition be strong enough to bear the ordinary traffic.

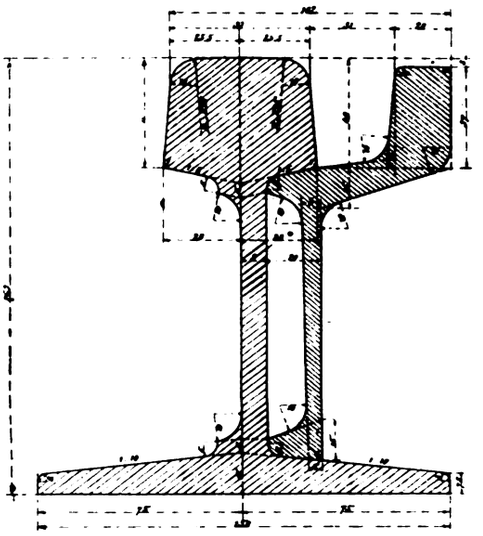
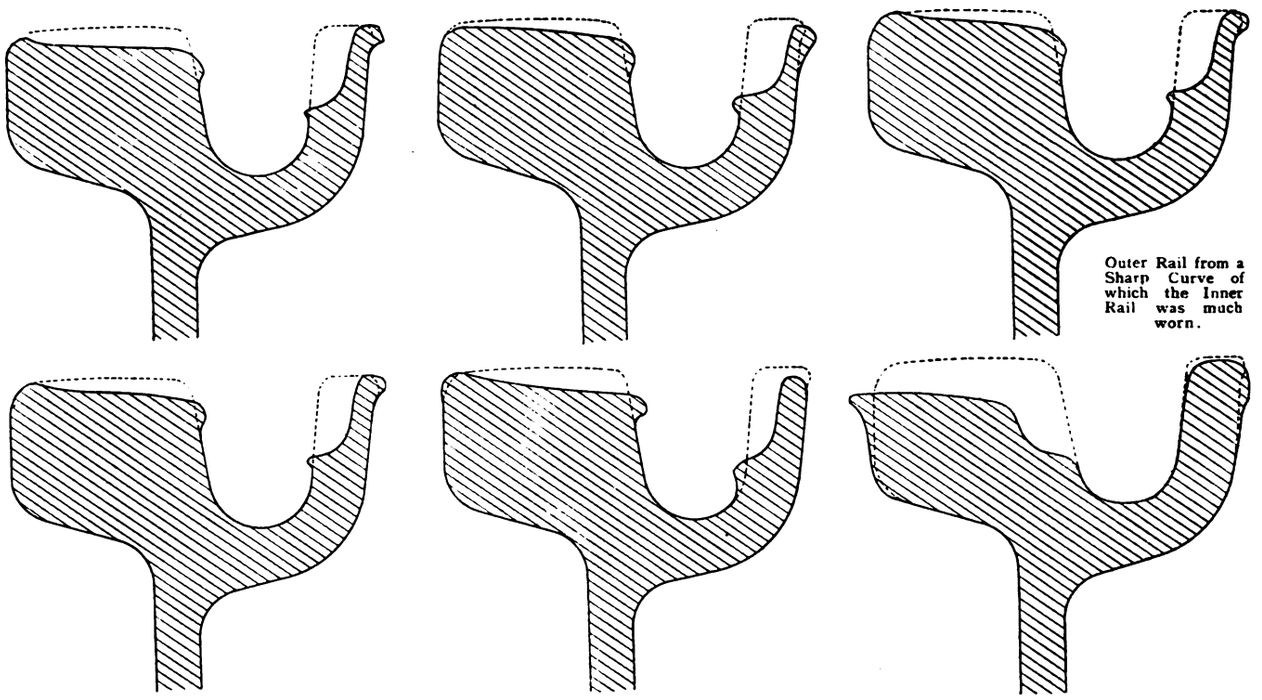


Fig. 2.—Section of the Haarmann Rail.

Many types of double rails are in use. Among them are the following:



Outer Rail from a Sharp Curve of which the Inner Rail was much worn.

Fig. 1.—Deformations of Inner Rails from Sharp Curves.

I.—The Haarmann Rail (Fig. 2).

This rail has the following disadvantages where, as in the case of our companies, not only is the U.T.F. (Union de Tramways de France) rail being adopted, but it is intended to generalise its use.

Fishing to the Broca U T.F. rails with the normal fish plates is impossible. Tie-bars are considerably altered. Under this arrangement there is no allowance for play, so that only the increased thickness of lip can be depended on; when this wear has attained a certain

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depth the attack on the outer rail will begin, and its deformation will become so serious that when the check rail has been renewed (the thickness of which is considerable) the outer rail also will have to be renewed.

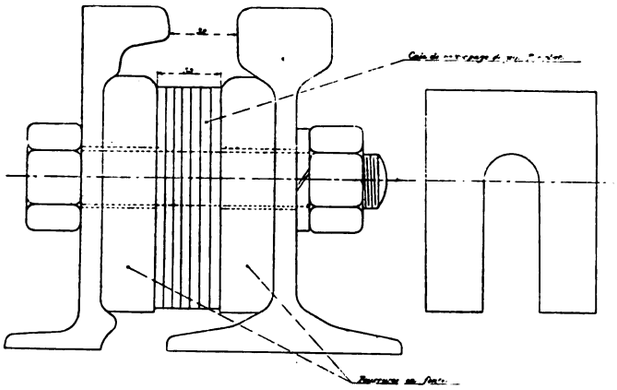

Fig. 3.—The Brussels Type of Rail.

Lastly, a serious cost is involved in renewing this check rail, as its weight is considerable, and it cannot be put to any other use.

II.—The Brussels Rail (Fig. 3).

In order to lay this down a type of Vignoles rail would have to be adopted which would work in with the Broca U.T.F. rail. The sketch (Fig. 4) given herewith shows that this junction is difficult, without, however, being impossible.

However, granting that such a Vignoles rail can be procured and that a Brussels type check rail is used which can be worked in with

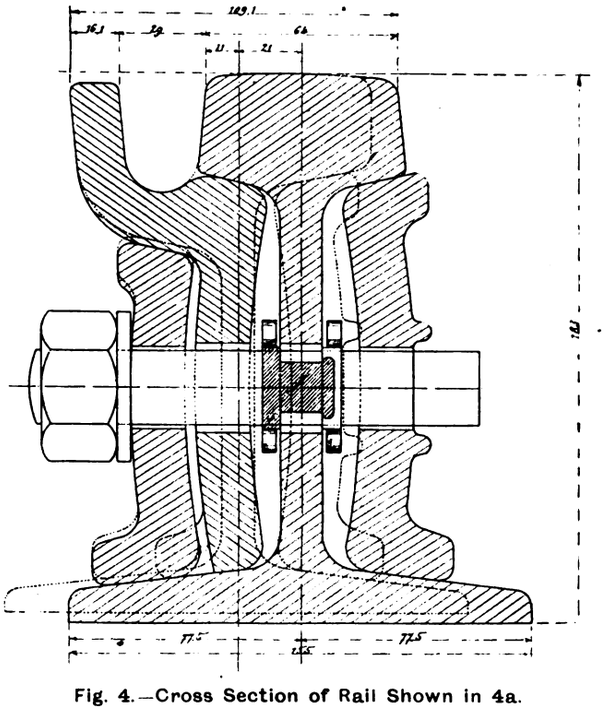

Fig. 4.—Cross Section of Rail Shown in 4a.

fastenings; the importance in weight and size of the part to be renewed; moreover, the check rail is not well seated; this is a serious disadvantage, as the passing of the ordinary road traffic might shift it.

The principal advantage of this arrangement is that the check rail can be brought closer to the running rail, when the former has been worn to a certain extent, owing to the provision of liners.

As a matter of fact, an allowance for play in any form is too difficult and complicated to be of any practical advantage.

III.—The Bordeaux Rail (Fig. 5).

This design is more satisfactory, as it fulfils some of the conditions laid down above. As a fact, the movable piece on which the wear,

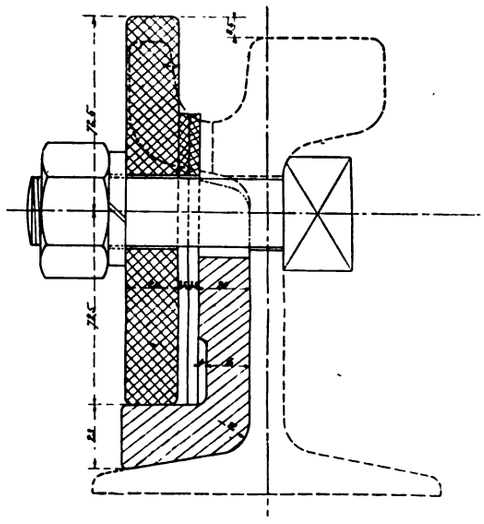

Fig. 5.—The Bordeaux Type of Rail.

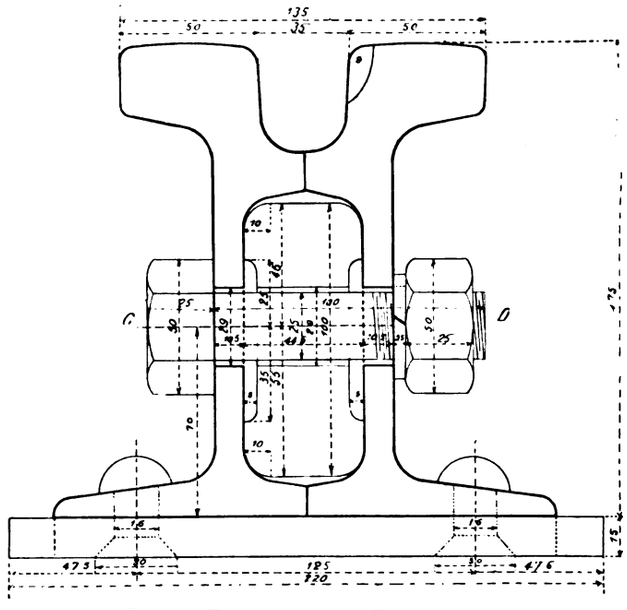

Fig. 6.—The Marseilles Type of Rail.

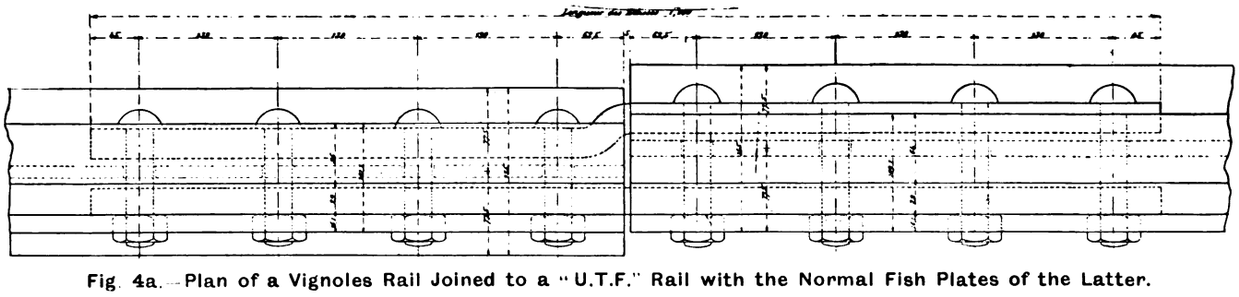

Fig. 4a.—Plan of a Vignoles Rail Joined to a "U.T.F." Rail with the Normal Fish Plates of the Latter.

this Vignoles rail, the following disadvantages would still remain: Impossibility of joining the ends of the special rail to the adjacent U.T.F rails except by almost entirely altering the normal fastenings; the difficulty of paving owing to the projection of the bolts and of the

due to the friction of the tramcar wheels, takes place is a very simple one, and owing to its symmetrical shape it can be turned and used again. The fishing to the adjacent rails is quite easy, as the support consists of an ordinary Broca rail (except, however, where the joint is

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in the middle of a curve). The only additional piece, the cast-iron packing piece, is not subject to wear. It may as well be pointed out that the liners between the packing piece and the thickened check rail are not designed to allow for play; they serve only to regulate the gauge. This system has the disadvantage of seriously altering the normal fastenings; moreover, the considerable projection of the bolts for fixing the thickened check rails interferes to some extent with the laying of the paving.

IV.—The Marseilles Rail (Fig. 6).

As shown by the drawing, in this design two grooved rails are joined together, from which have been previously removed the lip and part of the bottom flange. The joining of these two parts is effected by means of a seat or bearing plate riveted to the two bottom flanges. In addition, between the inside faces of the web there is inserted a shaped cast-iron filling piece, the whole being strongly held together by bolts.

Although fishing is possible at the ends of curves, it will be seen that the fastening or bracing is altered extensively. Moreover, the check rail is of larger section.

V.—The Bulfin Rail (Fig. 7).

This very interesting system is also employed on the Marseilles tramways. It consists of replacing the worn out small lip, cut off by a blow-pipe, by a new wing rail of special shape which can be fastened

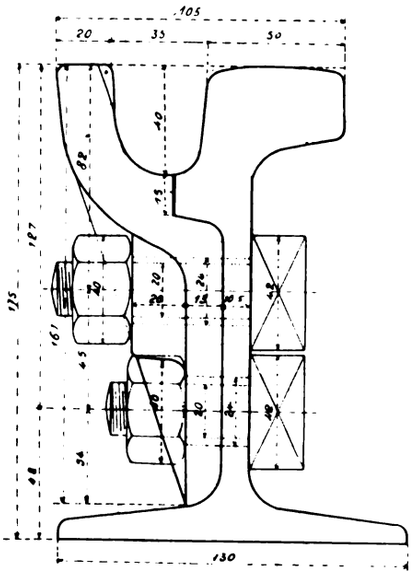


Fig. 7.—The Bulfin Guard Rail.

to the web of the rail. This new check rail is of manganese steel. The fishing of ends is possible, and on curves can be effected with ordinary fish plates and the thickened check rail; and the normal fastening has to be but slightly modified. On the other hand, the curved pieces which form the check rail are delivered in 1½-metre lengths, so that there are a great number of joints, which has a detrimental effect on car wheel tyres.

VI.—The Holt Rail (Fig. 8).

This design fulfils best of all the conditions we have enumerated as essential to a satisfactory compound rail in two parts. Moreover, it

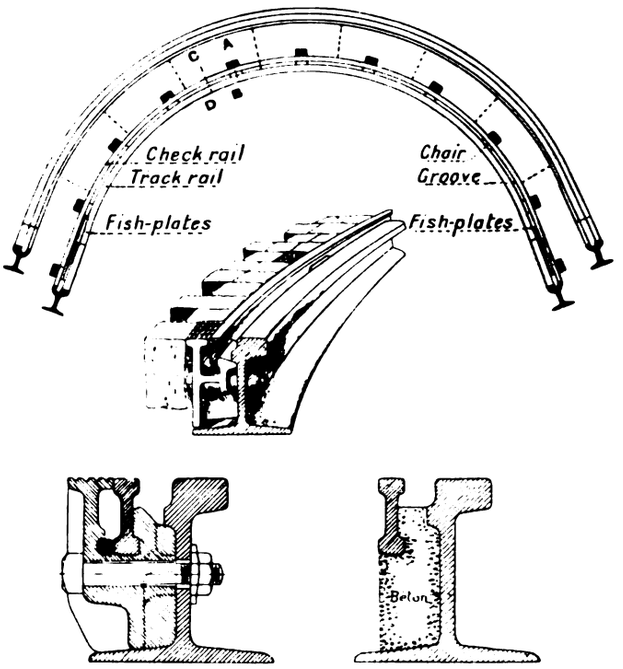


Fig. 8.—The Holt Guard Rail.

has been in use for a certain number of years in Leeds, and it would appear that the results obtained have been very satisfactory.

VII.—Design Proposed by One of the Members (Fig. 9).

The present U.T.F. rail would be altered as follows:

The lip, which is vertical in the U.T.F. rail, would be bent over horizontally, and on this extended lip a rectangular bar would be fixed of a predetermined section and quality. This bar would act as the check rail. The section of this compound rail would be such that no change would be necessitated in the fish plates, or in any fastening or anchorage of the U.T.F. rails at present in use. The rolling of the proposed section would be all the easier, as in some mills the U.T.F. rail is formed with this particular section; it is only during the last two passes that the lip, at first horizontal, is raised to a vertical

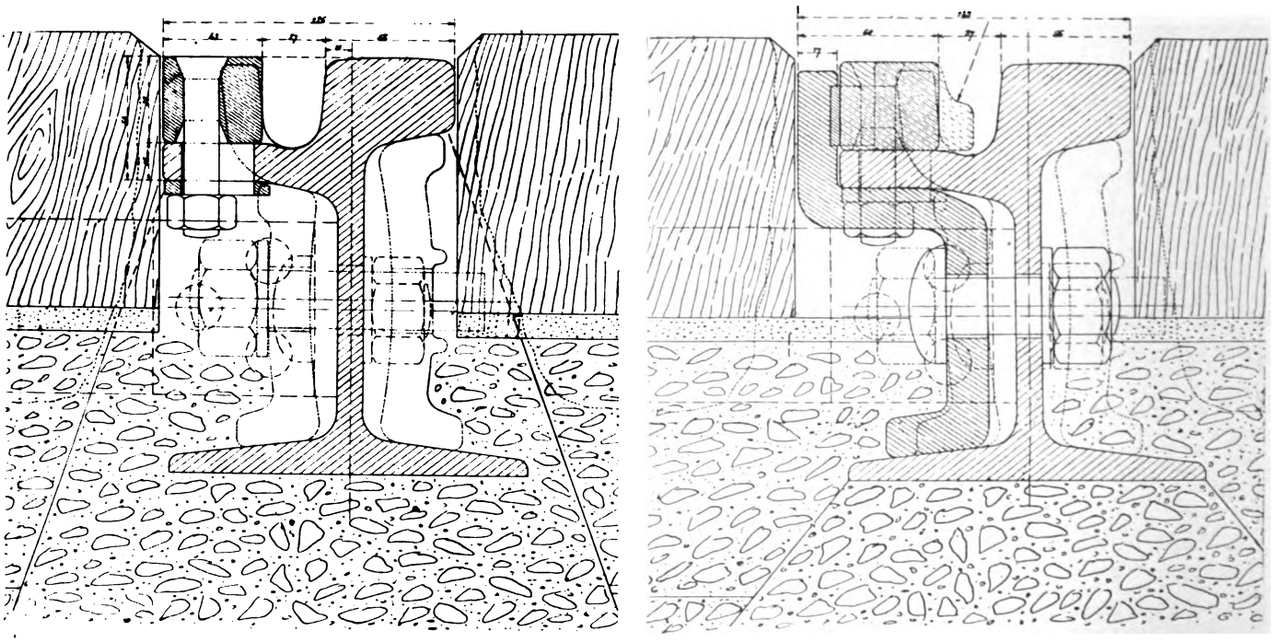

Fig. 9.—Design Proposed by a Member of the Commission.

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position. It should be pointed out that this horizontal lip is always on the convex side of the inner rail; this facilitates the bending.

The difficulty of firmly seating this horizontal lip or flange on the concrete has led to the introduction of rolled steel supports at certain distances apart; these, besides supporting the horizontal flange, act as bearing studs for the rectangular bar or check rail. The allowance for play being rejected as hardly practical, this check rail, of which the position is unchanged, may be used a second time after turning it end for end. It might even be used four times if it were possible to carry out both a straightening and a new bending. As far as the width of the rails on the road is concerned, it is no greater than that of conduit slot rails, where each of the conduit rails is 60 mm. wide.

In order to compare the different systems enumerated above, it would appear advisable to give the cost of a certain number of them. The comparative costs are approximately as follow:

### Comparative Cost of Different Types of Rails, on Curves, that have been in use.

This comparison is made on a curve of 16 metres average radius, carrying a traffic with about two minutes' headway, and showing after four years' service a lateral wear of 10 mm. on the check rail of the inner rail, and on the tread of the outer rail. With the type U.T.F. 2 adopted by the Union des Tramways de France, the width of the groove would be increased from 32 to 42 mm.; this would seem to be the limit allowable before renewing the rails worn laterally. A renewal of rails on curves every four years is a heavy charge. The question has been raised whether it would not be advantageous to use hard manganese steel rails, of which the lateral wear is generally admitted to be only one-fifth that in steel rails of the quality employed at present. Thereby the life of the rails would be extended to 20 years, and would approach that of rails on straight track bearing a similar traffic. It is on the supposition of this 20 years' life that the comparisons will be made between the different types of rails on curves and on a single line, both as regards the first cost per metre of laying them down and the cost of renewing them.

#### (A) Ordinary Rails.

1. *Manganese steel rails.*

| | |
|---|---|
| Two rails of 53 kgs. per metre = 106 kgs. at 1 fr. 20 per kg. | 127 frs. 20 |
| Value of old metal: 100 kgs. at 7 frs. per 100 kgs. | 7 frs. 00 |
| Cost in 20 years of a metre length of single line | 120 frs. 20 |

2. *Ordinary steel rails, with widened groove and reinforced check rails.*

| | |
|---|---|
| First cost of laying them down: two rails of 53 kgs. per metre = 106 kgs. at 220 frs. a ton | 23 frs. 32 |
| Less value of old metal: 100 kgs. at 7 frs. per 100 kgs. | 7 frs. 00 |
| Cost for four years | 16 frs. 32 |
| Four renewals, each costing as above, plus the removal; the bending of the new rails, the laying, the drilling, at the repaving estimate at 8 frs. 20. | |
| Cost of four renewals (16·32 + 8·20) × 4 = 98·08. Cost in 20 years | 114 frs. 40 |

3. *Silicon steel rails.*

| | |
|---|---|
| 80 to 82 kgs. breaking strain and giving, according to M. Rochat's reports, a life 25 per cent. greater than that of ordinary rails, at a cost of 10 per cent. higher. The result is an economy of 15 per cent., reducing the cost in 20 years to | 100 frs. 00 |

#### (B) Compound Rails.

4. *Marseilles System.*

| | |
|---|---|
| First cost of laying down four rails at 36 kgs. = 144 kgs. | |
| Cover plates per metre run 6 kgs., say 150 kgs. at 200 frs. a ton | 30 frs. 00 |
| Add for bolts, rebending of four rails instead of two, special fish plates, shortening of tie-bars, fixing, and riveting | 8 frs. 00 |
| | 38 frs. 00 |
| Less value of old metal—70 kgs. at 7 frs. per 100 kgs. | 4 frs. 90 |
| Cost for four years | 33 frs. 10 |
| Renewals four, each involving 72 kgs. at 200 frs. 00 a ton | 14 frs. 00 |
| Add for expenses, new riveting, fixing, repaving, 6 frs 00 | 20 frs. 40 |
| Less old metal | 4 frs. 90 |
| Balance | 15 frs. 50 |
| and for four renewals—62 frs. 00. | |
| Cost in 20 years = 33 frs. 10 + 62 frs. 00 = | 95 frs. 10 |

Rails with widened groove after renewal of the check rail by a manganese steel check rail.

5. *Bulfin Type System.*

| | |
|---|---|
| First cost of laying down as for No. 2—cost for four years | 16 frs. 32 |
| Renewal—The manganese steel check rail being the only part subject to wear, its life may be taken at 10 years, or five times that of a steel check rail subject to the whole of the lateral wear. | |
| Taking out the worn check rail | 2 frs. 00 |
| Manganese steel check rail with bolts and fixing | 45 frs. 00 |
| For 10 years | 47 frs. 00 |
| Renewal for six years $\frac{47 \times 6}{10}$ | 28 frs. 20 |
| | 91 frs. 52 |
| Less sale of old manganese, 22 kgs. at 7 frs. 00 the 100 kgs. | 1 fr. 54 |
| Cost in 20 years | 89 frs. 98 |

Rails with widened groove and renewable with a rolled rail—steel check rail with adjustable clip.

6. *Bordeaux System.*

| | |
|---|---|
| First cost of laying down as for No. 2 cost for four years | 16 frs. 32 |
| Renewals: | |
| Taking out the worn check rails | 2 frs. 00 |
| Rolled wing rail of 25 kgs. with adjusting clip | 5 frs. 50 |
| Bolts, bending, fixing, including taking up and relaying paving | 4 frs. 50 |

As the check rail alone is subject to wear, a wear of 7 mm. 5, thickness of the packing piece will occur in 18 months, when the packing can be taken out, and the wing rail will last another 18 months.

| | |
|---|---|
| Unfastening to take out the distance piece and making good, including taking up and relaying paving | 3 frs. 00 |
| Cost of renewals every three years (5·50 + 4·50 + 3) | 13 frs. 00 |
| Five renewals 1 to 3 = 69 frs. less sale of old metal, 100 kgs. (5 × 20) at 7 frs. 00 | 62 frs. 00 |
| Total cost in 20 years = (16·32 + 2 + 62) | 80 frs. 32 |

But there is a refixing of work every 18 months, and the cars are only guided by the check rail of the inner rail, which is a disadvantage.

7.—*The Holt Type System.*

Manganese steel check rail, which by turning can be used twice.

| | |
|---|---|
| First cost of laying them same as No. 2 for four years | 16 frs. 32 |
| Renewals. | |
| Taking out the worn check rail | 2 frs. 00 |
| Holt check rail with chairs and bolts | 40 frs. 00 |
| Turning the check rail after 10 years' use, unfastening, refixing, and paving | 3 frs. 00 |
| For 6 years = $\frac{3 \times 6}{10}$ | 1 fr. 80 |
| Cost in 20 years = 16·32 + 2 + 40 + 1 fr. 80 | 60 frs. 12 |

These calculations, based on the average price of some provincial tramways, may vary according to local conditions, especially according to the nature of the road surface. To summarise, the several systems considered may be classed in proportion to the following figures:

| | | |
|---|---|---|
| 1. | Manganese steel rails | 120 frs. |
| 2. | Ordinary steel rails | 114 „ |
| 3. | Silicon steel rails | 100 „ |
| 4. | Marseilles system | 95 „ |
| 5. | Bulfin type system | 88 „ |
| 6. | Bordeaux system | 80 „ |
| 7. | Holt type system | 60 „ |

The last system should therefore be chosen on all curves which wear out in less than four or even six years; the advantage increasing with the amount of wear on curves in two years and one year. For those on which ordinary check rails would wear out after eight years similar calculations would give the following figures:

| | | |
|---|---|---|
| 1. | Manganese steel rails | 60 frs. |
| 2. | Ordinary steel rails | 52 „ |
| 3. | Silicon steel rails | 45 „ |
| 4. | Marseilles system | 56 „ |
| 5. | Bulfin type system | 46 „ |
| 6. | Bordeaux system | 40 „ |
| 7. | Holt type system | 41 „ |

In this case the advantage would lie with the Bordeaux type, but this system is more easily disturbed than Holt's.

Lastly, for curves of over 25 metres radius and with lighter traffic, of seven or eight minutes' headway on the same track, the ordinary rails with widened grove would be the most economical for the inner rail. The figures given above show the advantage of compound rails for the inner rails on sharp curves.

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Consequently the Commission is of opinion:

1.—That the system designed by one of its members deserves close study, and should be tested so that it might be compared with those already tried.

2.—Of all the systems in practical use at the present time, to the knowledge of the Commission, and set out above, those which it appears should be recommended more particularly to the members are, in their order of preference:

(*a*) In the case of curves on which working has shown the necessity of renewal in less than four years:

1. The Holt system, or, if the curves are not very sharp, the Bordeaux or Bulfin system.

(*b*) In the case of curves of which the working has shown the necessity of renewal after eight years.

The same conclusions as in the preceding case.

(*c*) In those cases where the renewals on curves have not been found necessary until the lapse of more than 10 years:

The rail U.T.F. 2 is the best for the inner rail; the outer rail may be of the ordinary type, except in the case of curves with a radius of less than 20 metres.

## RAILLESS TROLLEY TRACTION.

DOUBLE-DECK CAR APPROVED FOR BRIGHTON.

A double-deck trolley car, similar in appearance to an omnibus, but having two trolley arms on top, has been sanctioned by the Board of Trade for use on the through railless trolley system to be installed in Brighton and Hove. The car was constructed by the R.E.T. Construction Company, Limited, Finsbury Pavement House, London, E.C. It weighs just under four tons unloaded. Delay has arisen in installing the railless trolley system in the main central thoroughfares of the two towns, owing to the desire of the Hove Corporation to wait until the Board of Trade had sanctioned a double-deck vehicle. Now that the Board's approval has been given, the Brighton Town Council will submit to Hove a scheme for carrying out the installation.

Ramsbottom Town Council have agreed to the Tramways Committee obtaining two additional cars for the railless trolley service. A sub-committee will visit the works of the various makers.

A company is being formed at Tokio to introduce railless trolley car services in six of the principal towns of Japan.

The Shanghai Electric Construction Company, Limited, are making trials of railless trolley cars, and if the experiments give satisfaction it is proposed to start a number of services on routes which are too narrow to permit of tramway construction.

The City Council of Launceston (Tasmania) have adopted a scheme providing for the running of railless trolley and motor omnibus services, and for the borrowing of £30,000 for tramway purposes.

The North Eastern Railway Company propose to apply for powers to run trolley cars in Newcastle and Gateshead in order to run a car service across the high-level bridge. For a number of years private companies have run omnibuses across the bridge, and some time ago the railway company failed in a legal action to compel these 'bus proprietors to pay ½d. per passenger carried, it being held that the toll of 4d. per vehicle was the only legal charge.

## FINANCIAL REPORTS AND MEETINGS.

**City of Buenos Ayres Tramways Company.**—The directors announce a dividend of 1s. 3d. per share (5 per cent. per annum) for the three months ended September 30.

**The Half-Year at Bournemouth.**—In his half-yearly report, Mr. I. Bulfin, general manager of the Corporation tramways, shows that the total receipts for the period ending September were £61,034, and the expenditure £32,689, which is an increase on the gross balance for the six months of £2,489, notwithstanding increases of wages and reduction of hours equal to £1,500 a year, and the increased cost of coal and other materials equal to £1,000 per annum. The increased receipts due to Sunday running amounted to £4,214.

**A Rating Question at Salford.**—In an appeal heard at Salford Quarter Sessions against the assessment of the tramways in Eccles, at the instance of Salford Corporation, the Court decided to treat the tramways in Eccles as an integral part of the whole system in considering what a hypothetical tenant would look at in dealing with the tramways. Therefore they dismissed the appeal with costs. Mr. Sutton, on behalf of the appellants, asked the Court to state a case, but the application was declined, the chairman remarking that the decision was based on a question of fact and not of law.

**Improved Position at Stalybridge.**—In replying to votes of thanks at the last meeting for the municipal year of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways Board, Alderman Ridyard said that neither the tramways nor the electricity department had ever shown as good results as they did to-day. In the electricity department there was a net profit of £509, while at the corresponding period last year there was a loss of £90. Up to the end of the first six months of last year the tramways showed a loss of £6,335; from last March up to the end of September this year the loss was only £1,535.

**Buenos Ayres Lacroze Tramways Company.**—The receipts for the year ended June 30 amounted to $6,162,305 legal currency, an increase of $511,477 on the previous year, and the working expenses were $3,839,729, an increase of $361,478, leaving $2,322,575 as net revenue, while $115,380 was received as interest, etc., and $24,917 was brought forward. After providing for debenture interest and other charges the divisible balance is $1,732,937. A dividend of 5 per cent. is proposed, adding $85 400 to the reserve, $250,000 to the renovation funds, and $23,134 to the fund for extraordinary expenses, and carrying forward $30,460.

**Cape Electric Tramways Company.**—At the annual meeting of the Cape Electric Tramways, Limited, held on November 5 in London, Mr. Ludwig Breitmeyer, who presided, said that the 12 months had shown a steady expansive development in regard to their systems at Cape Town and Port Elizabeth. Last year they had increased the passenger traffic by nearly 1,000,000, and the receipts by about £8,000 beyond the figures of the previous year. This year these figures had again been topped, inasmuch as they carried 1,500,000 more passengers, with an increase in receipts of £12,000. The first quarter of the current year showed an increase in receipts of £2,090 as compared with the same period in 1912. The report was adopted, and a dividend of 5 per cent. on the ordinary shares was declared.

**Progress at Newcastle.**—Alderman Rodgers has presented to the Corporation the appended comparative return of tramways traffic from April 1 to November 1:

| | Receipts. | | | Passengers. | Miles. | Average per Car-mile. |
|---|---|---|---|---|---|---|
| | £ | s. | d. | | | |
| 1913 | 150,900 | 14 | 1½ | 33,405,022 | 3,100,388 | 11·62 |
| 1912 | 135,708 | 3 | 6½ | 29,851,017 | 2,755,602 | 11·82 |
| 1911 | 132,670 | 18 | 2 | 28,842,065 | 2,688,386 | 11·84 |

A report of the Tramways Committee, recommending an increase of 1s. per week in the wages of motormen and conductors, has been adopted.

**Ferranti, Limited.**—In moving the adoption of the report at the eighth annual meeting of this company, Mr. A. W. Tait stated that the result of the trading was £59,509, as against £51,759 the previous year. The net profits showed an increase of £2,867. The balance of profit was £9,096, plus the amount at credit at June 30, 1912—£12,456—making together £22,452. There had been carried to general reserve account £22,000, leaving a balance to be carried forward of £452. In accordance with the usual practice, £10,000 has been carried to depreciation reserve, which now stood at £56,350. With regard to the amount which had been carried to general reserve account, in accordance with the arrangement made in connection with the repayment of the prior lien debentures and the issue of the 5-year notes, the company were not in a position to make any payment to the shareholders until these notes had been redeemed. As they were aware, the notes fell due in 1917. During the year under review the turnover was a record since the date of the reorganisation.

**Provincial Tramways Company, Limited.**—Mr. A. Bettie, J.P., presided on November 21 at the fifty-sixth ordinary meeting of the Provincial Tramways, Limited. The directors' report showed that the net revenue received from the local companies was £41,683, and that the total net revenue was £46,600. After deducting £8,750 for interest to debenture holders for the year, £6,000 for preference dividend, £4,152 for interim dividend on ordinary shares, and other expenses, the balance remaining was £24,668. Out of this the directors set aside £12,000 to the credit of reserve and depreciation account, and £2,000 for third-party insurance or for other purposes, leaving a balance of £10,668. Out of this they recommended a dividend of 1s. per share upon the £1 ordinary shares, making with 8d. per share paid in June last 1s. 8d. per share, equal to a dividend of 8⅓ per cent. per annum for the year. The sum of £4,440 is to be carried forward. Mr. Bettie said the net profit was a record, although the cost of coal remained high, and the cost of oil fuel used in their Diesel engines had been practically doubled. Wages had also been increased to the satisfaction of the employees. Efficiency in all departments had been their first thought and attention, and they believed their system of working was one of the most economical in the running and timing of cars, so as to prevent duplication. They had now obtained a 25 years' lease of their Plymouth and Devonport system at an increased price for wayleave, but they found it to be quite satisfactory. Negotiations were proceeding for extensions of leases in other places. Motor omnibuses had been used during the year, with the result that their profits had been increased and they had warded off competition from their tramways. The meeting increased the directors' fees from £200 to £300 a year, and voted an additional £100 to the chairman.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LICHTING PURPOSES.

| Name. | Year Ended. | Electric Traction Inaugurated. | System. | Line open (single track). Mls. Chs. | Borrowing Powers. | Borrowing Powers Exercised. | Unexhausted Borrowing Powers. | Total Capital Expenditure. | Capital Expenditure per Mile of Single Track. | Loans Outstanding. | Loans Repaid and Sinking Fund. | Depreciation, Renewal and Reserve Funds. | Gross Receipts. Traffic. | Other. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aberdeen | †May 31, 1913 | Dec., 1899 | E. | 27 66 | 350.000 | .. | ... | 350,590 | 12,599 | 192.660 | 157,929 | 143,468 | 79,125 | 1,041 | 80.166 |
| Accrington | †Mar. 31, 1913 | Aug., 1907 | ,, | 10 53 | 169,675 | 134,670 | 35,800 | 134,525 | 12,619 | 116,976 | 17,694 | 13,200 | 27,419 | 403 | 27,822 |
| Ashton-u-Lyne | †Mar. 25, 1913 | Aug., 1902 | ,, | 8 15 | 130.070 | 108,099 | 21.971 | 108,099 | 13,203 | 83,240 | 24,859 | 1,650 | 21,340 | 551 | 21,891 |
| Ayr | †May 15, 1913 | Sept., 1901 | ,, | 7 40 | ... | ... | ... | 85,445 | 11,224 | 78,933 | 18,044 | 14,918 | 15,626 | 670 | 16,296 |
| Birmingham | †Mar. 31, 1913 | Jan., 1904 | ,, | 108 32 | 2,302,001 | 2,089,194 | 212,807 | 1,981,288 | 18,280 | 1,874,109 | 215,084 | 220,369 | 574,248 | 7,318 | 581,566 |
| Blackburn | †Mar. 25, 1913 | Mar., 1899 | ,, | 24 63 | 408,174 | 342,474 | 65,700 | 334,924 | 13,512 | 254,600 | 167,381 | 1,000 | 63,440 | 3,243 | 66,683 |
| Blackpool | †Mar. 31, 1913 | June, 1899 | ,, | 21 31 | 453,798 | 301,796 | 152,002 | 301,796 | 14,115 | 301,796 | 114,086 | 15,126 | 73,155 | 1,011 | 74,166 |
| Bolton | †Mar. 31, 1913 | Dec., 1899 | ,, | 47 17 | 552.208 | 551,019 | 1,189 | 559,107 | 11,842 | 338,439 | 162,580 | 55,901 | 135,149 | 1,313 | 136,462 |
| Bradford | †Mar. 31, 1913 | July, 1898 | ,, | (h)103 69 | 1,269,568 | 982,398 | 287.170 | 1,002,566 | 9,653 | 607,928 | 388,335 | 89.072 | 280,758 | 18,345 | 299,103 |
| Brighton | †Mar. 31, 1913 | Nov., 1901 | ,, | 17 15 | 358,620 | 279,000 | 80.715 | 277,914 | 16,170 | 223,556 | 55,653 | 6,708 | 51,780 | 2,018 | 53,798 |
| Burnley | †Mar. 31, 1913 | Dec., 1901 | ,, | 22 13 | 388,052 | 339.125 | 48.927 | 231,601 | 10,450 | 179,498 | 56,652 | 48.212 | 79,641 | 249 | 79.890 |
| Burton-on-Trent | †Mar. 31, 1913 | Aug., 1903 | ,, | 9 60 | 108,632 | 104,562 | 4.070 | 106,225 | 10.895 | 50.583 | 53,979 | 8,966 | 14,383 | 1,304 | 15.687 |
| Bury | †Mar. 31, 1913 | June, 1903 | ,, | 21 14<br>(b)13 21 | 407,800 | 280,775 | 127,025 | 283,005 | 13,365 | 262,135 | 42,877 | (j)24,571 | 67,370 | 284 | 67,654 |
| Chester | †Mar. 25, 1913 | April, 1903 | ,, | 6 35 | 92,991 | 82.380 | 10.611 | 82.934 | 12,883 | 69,727 | 12,785 | 2,968 | 12.272 | 458 | 12,730 |
| Chesterfield | †Mar. 31, 1913 | Dec., 1904 | ,, | 5 8 | 95,000 | 70,500 | 24,500 | 69,575 | 13.642 | 58,510 | 11,990 | 5,031 | 12,220 | 474 | 12,694 |
| Colchester | †Mar. 31, 1913 | July, 1904 | ,, | 7 75 | 70,748 | 69,555 | 1.193 | 69,401 | 8.743 | 53,425 | 17,049 | Nil. | 10,281 | 477 | 10,758 |
| Croydon | †Mar. 31, 1913 | June, 1906 | ,, | 19 10 | 287.689 | 287,689 | Nil | 284,847 | 14,894 | 230,968 | 87,264 | 42,453 | 90.543 | 1,921 | 92,464 |
| Darlington | †Mar. 31, 1913 | June, 1904 | ,, | 8 71 | 107.500 | 76,263 | 31,237 | 76,322 | 8,587 | 56,888 | 19,434 | 5,726 | 11,842 | 334 | 12,176 |
| Darwen | †Mar. 31, 1913 | Oct., 1900 | ,, | 7 13 | 93.400 | 86,300 | 7,100 | 86,300 | 12.018 | 57,320 | 28.280 | 7,450 | 14,244 | 1,176 | 15,420 |
| Derby | †Mar. 31, 1913 | July, 1904 | E.<br>H. | 22 5 | ... | ... | ... | 242,785 | 11,004 | 157,213 | 85,572 | (a)4,486 | E 46,820<br>H 394 | 1,030<br>22 | 47,850<br>416 |
| Doncaster | †Mar. 31, 1913 | June, 1902 | E. | 12 42 | ... | ... | .. | 99.172 | 7.918 | 80.400 | 14.741 | 780 | 19,928 | 334 | 20,262 |
| Dundee | †May 15, 1913 | July, 1900 | ,, | 27 38 | (f) | 345,450 | ... | 352.663 | 12,835 | 262,038 | 83,411 | 71,823 | 63,395 | 1,650 | 65,045 |
| East Ham | †Mar. 31, 1913 | June, 1901 | ,, | 14 52 | 190,643 | 190,242 | 401 | 191,583 | 13,367 | 148,515 | 58,075 | 5,097 | 57,050 | 610 | 57,660 |
| Exeter | †Mar. 31, 1913 | April, 1905 | ,, | 7 0 | 106.000 | 86,111 | 19,889 | 86,111 | 12,301 | 69,376 | 17,209 | 5,915 | 16,748 | Nil | 16,748 |
| Gloucester | †Mar. 31, 1913 | April, 1904 | ,, | 15 0 | 191,000 | 144,243 | 46,757 | 147,692 | 9.846 | 111,651 | 16,816 | 750 | 16,177 | 1,168 | 17,345 |
| Halifax | †Mar. 31, 1913 | June, 1898 | ,, | 54 70 | 449.263 | 412,876 | 36,387 | 414,246 | 7,549 | 299,480 | 105,948 | 27,379 | 104,947 | 1,026 | 105,973 |
| Ilford | †Mar. 31, 1913 | Mar., 1903 | ,, | 11 28 | 149.633 | 149,633 | Nil | 149,500 | 13.171 | 109,912 | 39,721 | 5,611 | 24,361 | 2,407 | 26,768 |
| Ilkeston | Mar. 31, 1912 | May, 1905 | ,, | 4 24 | 64,214 | 47,000 | 15,074 | 47,936 | 11,148 | 42,600 | 11,919 | 350 | 6,533 | 156 | 6,689 |
| Ipswich | †Mar. 31, 1913 | Nov., 1903 | ,, | 14 70 | 116.471 | 114,300 | 2,171 | 114,838 | 7,720 | 98,858 | 16,305 | 8,180 | 22,575 | 829 | 23,404 |
| Keighley | †Mar. 31, 1913 | Oct., 1904 | ,, | 6 9 | 50.934 | 47,328 | 3,606 | 47,328 | 7,743 | 32,468 | 16,961 | 942 | 8,845 | 313 | 9,158 |
| Kilmarnock | †May 15, 1913 | Dec., 1904 | ,, | 5 47 | 65,000 | 52,625 | 12,375 | 53,191 | 9,519 | 44,766 | 7,379 | 4,017 | 8,543 | 248 | 8,791 |
| Kirkcaldy | †May 15, 1913 | Feb., 1903 | ,, | 8 45 | 213.000 | 96,748 | 116,252 | 96,749 | 11,025 | 80,333 | 16,415 | 4,161 | 15,712 | 494 | 16,206 |
| Lancaster | †Mar. 31, 1913 | Jan., 1903 | ,, | 4 65 | 60.000 | 51,550 | 8,450 | 43,432 | 9.022 | 36,200 | 13,838 | 3,000 | 5,437 | 143 | 5,580 |
| Leith | †May 15, 1913 | Aug., 1905 | ,, | 17 73 | 275.000 | 237,300 | 37,700 | 236,155 | 14.572 | 186,500 | 50.800 | 514 | 34,664 | 1,030 | 35,694 |
| Leyton | †Mar. 31, 1913 | Dec., 1906 | ,, | 18 40 | 306,427 | 306,371 | 56 | 295.376 | 15,966 | 249,165 | 48,876 | 3,445 | 68,809 | 1,558 | 70,367 |
| Lincoln | †Mar. 31, 1913 | Nov., 1905 | S. | 2 77 | 98.519 | 44.947 | 53.572 | 44,992 | 15,187 | 42,893 | 9,862 | (a) 1,600 | 6,717 | 128 | 6,845 |
| Liverpool | †Dec. 31, 1912 | Nov., 1898 | E. | 119 0 | ... | ... | ... | 2.015,193 | 16,934 | 1,245,282 | 1,012,873 | 430,509 | 631,071 | 13,103 | 644,174 |
| Lowestoft | †Sep. 30, 1912 | July, 1903 | ,, | 4 6 | 94.230 | 87,031 | 7,199 | 87,031 | 21,357 | 67.833 | 13.067 | ... | 10,781 | 17 | 10,798 |
| Maidstone | †Mar. 31, 1913 | July, 1904 | ,, | 7 3 | 82.932 | 82,582 | 350 | 79,098 | 11.239 | 67,191 | 15,391 | Nil. | 9,761 | 535 | 10.296 |
| Manchester | †Mar. 31, 1913 | June, 1901 | ,, | 188 30 | 2,355.689 | 2,034.371 | 321,318 | 2.051,731 | 10,945 | 1,543,504 | 437,305 | 479,683 | 876.023 | 11,624 | 887,647 |
| Nelson | †Mar. 31, 1913 | Feb., 1903 | ,, | 3 69 | 38.000 | 37,832 | 168 | 37,832 | 9,795 | 30,118 | 7,714 | ... | 10,240 | 51 | 10.291 |
| Newport (Mon.) | †Mar. 31, 1913 | April, 1903 | ,, | 14 28 | 219.250 | 196.250 | 23,000 | 193,191 | 13,463 | 164,763 | 31,487 | 9.035 | 37,555 | 995 | 38,550 |
| Nottingham | †Mar. 31, 1913 | Jan., 1901 | ,, | 37 40 | 730.300 | 725,945 | 4,355 | 638,005 | 17,479 | 426,818 | 217,041 | 64,242 | 161,746 | 2,404 | 167,160 |
| Oldham | †Mar. 25, 1913 | May, 1902 | ,, | 28 6<br>(b) 8 31 | 516,925 | 440,204 | 76,719 | 442,174 | 15,750 | 320,725 | 118,217 | 2,135 | 108,003 | 2,574 | 110,577 |
| Perth | †May 15, 1913 | Nov., 1905 | ,, | 6 60 | 90,000 | 78,350 | 11,650 | 78,629 | 11,649 | 63,340 | 15,489 | 1,673 | 8,761 | 509 | 9,270 |
| Plymouth | †Mar. 31, 1913 | Sept., 1899 | ,, | 15 0 | ... | 169,512 | ... | 219,417 | 14,628 | 90,925 | 37,826 | 17,550 | 37,925 | 1,123 | 39,048 |
| Pontypridd | Mar. 31, 1912 | Mar., 1905 | ,, | 8 48 | 136,019 | 135,885 | 134 | 136,896 | 15,919 | 112,862 | 22,899 | ... | 21,130 | 2,036 | 23,166 |
| Rawtenstall | †Mar. 31, 1913 | May, 1909 | ,, | 15 71 | 193,290 | 181,526 | 11,764 | 181,776 | 14,442 | 162,451 | 19,075 | 3,177 | 25,410 | 1,126 | 26,536 |
| Rochdale | †Mar. 31, 1913 | May, 1902 | ,, | (i) 40 2 | 356,991 | 347,782 | 9,209 | 353,066 | 15,401 | 347,782 | 83,475 | 5,904 | 80,058 | 287 | 80.345 |
| Rotherham | †Mar. 31, 1913 | Jan., 1903 | R.T | 12 2 | ... | ... | ... | 162,504 | 13,542 | 141,850 | 27,250 | 21,203 | 40,232<br>2,457 | 26<br>Nil | 40,258<br>2,457 |
| Salford | †Mar. 31, 1913 | Oct., 1901 | F. | 75 64 | 1,050,666 | 723,669 | 326,997 | 723,672 | 9,599 | 536.791 | 258,977 | 45,699 | 260,365 | 486 | 260,851 |
| Southampton | †Mar. 31, 1912 | Jan., 1900 | ,, | 17 62 | 277.259 | 239.715 | 37.544 | 247,977 | 13.951 | 169,010 | 70.726 | 18,497 | 63.849 | 2,260 | 66,109 |
| Southend-on-Sea | †Mar. 31, 1913 | July, 1901 | ,, | 11 49 | 130,000 | 129,961 | 39 | 143,608 | 12.384 | 116,940 | 12.784 | 3,045 | 34,453 | 465 | 34,918 |
| Southport | †Mar. 31, 1913 | July, 1900 | ,, | (d) 10 63 | 292.000 | 196,500 | 95.500 | 118,708 | 11,004 | 153,530 | 42,970 | 442 | 16,928 | 386 | 17,314 |
| South Shields | †Mar. 31, 1913 | Mar., 1906 | ,, | 10 21 | 251,883 | 174,936 | 76,947 | 172,476 | 16,806 | 150,228 | 30.818 | 20,833 | 33,654 | 498 | 34,152 |
| Staly'ge, H., M., D. | †Mar 31, 1913 | May, 1904 | ,, | 27 57 | 325.270 | 274.990 | 44.280 | 279,778 | 10,096 | 224,700 | 56,290 | 500 | 34,961 | 677 | 35,638 |
| Stockport | Mar. 31, 1912 | Aug., 1902 | ,, | 27 50 | 305,028 | 234.500 | 70,528 | 238,199 | 8,623 | 176,002 | 58,498 | 54,219 | 59,594 | 1,245 | 60,839 |
| Sunderland | †Mar. 31, 1913 | Aug., 1900 | ,, | 20 28 | 308,699 | 303,211 | 5,488 | 305,234 | 14,999 | 182,318 | 111,943 | 31,883 | 68,507 | 364 | 68,871 |
| Wallasey | †Mar. 31, 1913 | Mar., 1902 | ,, | 19 69 | 198.167 | 195,290 | 2.877 | 215,424 | 10.846 | 167,924 | 58,733 | 11,927 | 57,458 | 564 | 58,022 |
| Walsall | †Dec. 31, 1912 | Dec., 1902 | ,, | 19 44 | 188,145 | 188,100 | 45 | 183,351 | 9,378 | 156,161 | 31,939 | 30,879 | 30,629 | 800 | 31,429 |
| Walthamstow | †Mar 31, 1913 | June, 1905 | ,, | 12 42 | 198,000 | 180,000 | 18,000 | 173,241 | 13,851 | 160,982 | 19 018 | 4,687 | 37,191 | 785 | 37,976 |
| Warrington | †Mar. 31, 1913 | April, 1902 | ,, | 9 52 | 103.674 | 102,896 | 778 | 102.128 | 10.583 | 73,830 | 29.068 | 10,000 | 22.903 | 302 | 23,205 |
| West Ham | †Mar. 31, 1913 | Feb., 1904 | ,, | 30 4 | 563,478 | 551,463 | 12,015 | 556,878 | 18,532 | 539,650 | 90,402 | 40,352 | 137,766 | 676 | 138,442 |
| Wigan | †Mar. 31, 1913 | April, 1901 | ,, | (k) 34 42 | ... | ... | ... | ... | ... | ... | ... | ... | 71,268 | 1,515 | 72,783 |
| Wolverhampton | †Mar. 31, 1913 | April, 1902 | S. | 21 40 | 279.733 | 265,616 | 14,117 | 278,615 | 12,959 | 217,882 | 47,734 | 50,220 | 53,963 | 797 | 54,760 |
| Yarmouth (Gt.) | †Mar. 31, 1913 | June, 1902 | E. | 14 32 | 144.500 | 119,750 | 24,750 | 121,899 | 8,465 | 111,450 | 22.737 | 6,070 | 23,625 | 508 | 24,133 |

## TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast | †Mar. 31, 1913 | Nov., 1905 | E. | 98 54 | 1,567.674 | 1,386,232 | 181,442 | 1,389,713 | 14,037 | 1,381,200 | 144,342 | 117,769 | 250,589 | 3,788 | 254,377 |
| Bexley | Mar. 31, 1912 | Oct., 1903 | ,, | 6 42 | 99,942 | 96,984 | 2,958 | 96,924 | 14,854 | 78,800 | 18,184 | (j)1,074 | 13,826 | 1,542 | 15,368 |
| Birkenhead | †Mar. 31, 1913 | Feb., 1901 | ,, | 24 7 | 375,848 | 364,854 | 10,994 | 366,610 | 15.220 | 247,012 | 117,863 | 18,070 | 61,202 | 4,365 | 65,567 |
| Bournemouth | †Mar. 31, 1913 | July, 1902 | ,, | (e) 29 62 | 449,027 | ... | ... | 435,788 | 19,500 | 221,797 | 131,815 | 13,733 | 95,695 | 317 | 96.012 |
| Cardiff | †Mar. 31, 1913 | May, 1902 | ,, | 31 66 | 818.573 | 787,292 | 19,564 | 783,270 | 24,612 | 542,488 | 244,803 | 92.968 | 129,265 | 21,361 | 150,626 |
| Coventry | †Mar. 31 1913 | Jan., 1912 | ,, | 15 40 | 220,538 | 216,436 | 4,102 | 211,298 | 13,632 | 216,436 | 3,287 | 2,876 | 38,996 | 157 | 39,153 |
| Glasgow | †May 31, 1913 | Oct., 1898 | ,, | 193 47<br>(b) 2 52 | 3,714,266 | 3,553,584 | 160,682 | 3,694,143 | 18,595 | 2,479,408 | 1,074,177 | 2,079,645 | 1,007,653 | 3,891 | 1,011,544 |
| Huddersfield | †Mar. 31, 1913 | Feb., 1901 | ,, | 46 0 | 646,284 | 407,142 | 239,142 | 417,408 | 9,074 | 255,177 | 161,349 | 19,132 | 106,586 | 3,123 | 109,709 |
| Hull | †Mar. 31, 1913 | July, 1899 | ,, | 30 44 | 677,673 | 541,871 | 135,802 | 542,371 | 17,753 | 527,641 | 147,925 | 125,407 | 157,018 | 1,393 | 158,441 |
| Leeds | †Mar. 31, 1913 | Aug., 1897 | ,, | 112 62 | 1,603.455 | 1,546,422 | 57,033 | 1,511,588 | 13,406 | 1,220,041 | 482.698 | 4,637 | 407,552 | 3.979 | 411,531 |
| Leicester | †Dec. 31, 1912 | May, 1904 | ,, | 37 0 | 739.240 | 719,223 | 20,017 | 722.021 | 19,514 | 607,476 | 129,211 | 100.000 | 134,966 | 12,705 | 147,671 |
| London | Mar. 31, 1912 | ... | H. | 23 30 | | | | | | | | | 60,357 | 1,335 | 61,692 |
| | | May, 1903 | C.E. | 255 60 | (c) | (c) | (c) | } 11,850,127 | ... | 11,309,789 | 2,423.040 | 920,402 | 2.231.902 | 62.587 | 2.294,489 |
| N'castle-on-Tyne | †Mar. 31, 1913 | Dec., 1901 | E. | 61 0 | 1,522,010 | 1,251,047 | 270,963 | 1,234,080 | 20,230 | 939,120 | 383,921 | 119,407 | 228.091 | 10,114 | 238.205 |
| Northampton | †Mar. 31, 1913 | July, 1904 | ,, | 9 13 | 239.800 | 127,255 | 112.545 | 135,481 | 14,786 | 91,176 | 36.078 | 10,499 | 27,250 | 899 | 28,149 |
| Portsmouth | †Mar 31, 1913 | Sep., 1901 | ,, | 30 66 | 662.280 | 698,319 | ... | 712,792 | 23.118 | 647,489 | 234,258 | 94,934 | 108.087 | 1.745 | 109.832 |
| Preston | †Mar. 31, 1913 | June, 1904 | ,, | 17 16 | 224,102 | 187,270 | 36,832 | 187,269 | 10.888 | 119,790 | 42,091 | 36,841 | 42,964 | 306 | 43,270 |
| Reading | †Mar. 31, 1913 | July, 1903 | ,, | 13 14 | 235.000 | 234,000 | 1,000 | 229,372 | 17,409 | 169,642 | 59.896 | 17.831 | 32,984 | 1.030 | 34,014 |
| Sheffield | †Mar. 25, 1913 | Sep., 1899 | ,, | 77 67 | 1.727.596 | 1,413,980 | 313,616 | 1,411.959 | 18.140 | 1,067.897 | 418.292 | 27.521 | 358.656 | 3.189 | 361,845 |
| Wellington, N.Z. | †Mar. 31, 1913 | ... | ,, | 30 7 | 496.423 | 496,423 | Nil | 606.771 | 20.165 | 496,423 | 33,486 | 109,066 | 149,446 | 826 | 150,272 |

C—Electric conduit system. E—Electric trolley system. H—Horse lines. RT—Railless trolley system S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed. (d) Not including 8 m. 78 ch. leased lines. (e) Unlimited. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased.
(j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance.



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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Working Expenses. | | | | | Gross Profit on Working. | Additions to Gross Profit. | Deductions from Gross Profit. | | | | | Net Surplus + or Deficit − |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traffic. | General. | Repairs & Maintenance. | Power. | Total. | | | Interest. | Sinking Fund. | Income Tax. | Depreciation & Renewal | Sundries. | Total. | |
| Aberdeen ... ... | 20.710 | 9,404 | 5.954 | 7.138 | 43.206 | 36,960 | 472 | 6.839 | 4.661 | ... | 13.407 | ... | 24.907 | + 12,525 |
| Accrington ... ... | 6.839 | 1,870 | 2,102 | 4.644 | 15,455 | 12,367 | ... | 4,000 | 3,693 | 127 | ... | ... | 7,820 | + 4,553 |
| Ashton-under-Lyne | 4.699 | 1,964 | 2,358 | 3,225 | 11,997 | 9,894 | ... | 2,814 | 3,536 | 440 | 750 | (1,004 | 8,544 | + 1,350 |
| Ayr ... ... ... | 3,486 | 1,964 | 1,604 | 1,989 | 9,043 | 7,253 | ... | 1,972 | 1,943 | 122 | 2,041 | ... | 6,078 | + 1,175 |
| Birmingham ... | 160,277 | 40,898 | 68,278 | 100,726 | 370,179 | 211,387 | 11,479 | 65,672 | 49,946 | ... | ... | 5,896 | 121,514 | + 101,352 |
| Blackburn ... ... | 14,863 | 4,262 | 12,392 | 10,999 | 42,516 | 24,167 | 110 | 5,292 | 14,909 | 206 | ... | ... | 20,407 | + 3,870 |
| Blackpool ... ... | 15,992 | 5,132 | 9,286 | 9,272 | 39,682 | 34,484 | ... | (h)9,184 | 6,969 | ... | 8,000 | ... | 24,153 | + 10,331 |
| Bolton ... ... | 29,821 | 8,646 | 15,984 | 19,767 | 74,213 | 62,244 | 1,114 | h)11,189 | 17,197 | 1,095 | 18,715 | 219 | 48,415 | + 14,943 |
| Bradford ... ... | 83,763 | 24,458 | 46,061 | 46,271 | 200,553 | 98,550 | 4,045 | 20,735 | 31,926 | 3,653 | 32,921 | 4,360 | 93,595 | + 9,000 |
| Brighton ... ... | 14,309 | 4,028 | 12,853 | 8,316 | 39,506 | 14,292 | 27 | 7,800 | 5,560 | ... | 27 | ... | 13,360 | + 932 |
| Burnley ... ... | 18,718 | 5,306 | 9,525 | 15,881 | 49,430 | 30,460 | ... | 5,662 | 6,491 | 893 | ... | (f)2,873 | 15,919 | + 14,541 |
| Burton-on-Trent ... | 5.111 | 1,322 | 2,903 | 2,998 | 12,334 | 3,353 | ... | 1,406 | 1,418 | ... | 1,500 | ... | 4,324 | − 971 |
| Bury ... ... ... | 14,761 | 4,349 | 6,633 | 8,026 | 33,769 | 33,885 | 337 | (h)7,974 | 4,824 | 244 | ... | (n)11,608 | 24,650 | + 9,572 |
| Chester ... ... | 3,349 | 1,574 | 878 | 2,203 | 8,004 | 4,726 | 93 | (h)2,761 | 1,018 | .. | 1,040 | ... | 4,819 | ... |
| Chesterfield ... | 2,739 | 1,230 | 1,912 | 2,110 | 7,991 | 4,703 | 253 | 2,287 | 1,849 | ... | ... | ... | 4,136 | + 820 |
| Colchester ... ... | 2,825 | 1,189 | 1,771 | 2,508 | 8,253 | 2,465 | 48 | (h) 2,159 | 2,319 | ... | ... | ... | 4,478 | − 1,965 |
| Croydon ... ... | 29,571 | 6,806 | 13,300 | 16,541 | 66,218 | 26,246 | 907 | 7,994 | 7,428 | 1,145 | ... | ... | 16,567 | + 10,586 |
| Darlington ... ... | 4,192 | 754 | 1,912 | 1,945 | 8,811 | 3,365 | 102 | 2.010 | 1,966 | 105 | 404 | 59 | 4,544 | − 1,077 |
| Darwen ... ... | 3.594 | 831 | 3,096 | 2,395 | 9,916 | 5,504 | 141 | 2,298 | 2,191 | ... | 1,050 | ... | 5,539 | + 106 |
| Derby ... ... | E 16,388<br>H 631 | 2,621<br>... | 4,768<br>73 | 8,200<br>... | 31,977<br>704 | 15,873<br>def. 288 | 547 | 6,388 | 3,363 | ... | 310 | (l) 300 | 10,361 | + 6,059 |
| Doncaster ... ... | 4.364 | 1,156 | 4.698 | 3,561 | 13.779 | 6,483 | 84 | 2.876 | 1,737 | ... | 664 | ... | 5,277 | + 1,290 |
| Dundee ... ... | 16,477 | 5,607 | 7,122 | 10.216 | 39,422 | 25,623 | ... | 8.606 | 6.020 | 233 | 9,254 | ... | 24,113 | + 1,510 |
| East Ham ... ... | 17.280 | 6.330 | 11.722 | 10,072 | 45.404 | 12.256 | ... | (h) 5.806 | 6.725 | ... | ... | 454 | 12.985 | − 729 |
| Exeter ... ... | 4,511 | 1,175 | 1,311 | 3,499 | 10,496 | 6,252 | ... | (h-2.347 | 1,814 | 48 | ... | ... | 4,209 | + 2,043 |
| Gloucester ... | 6.891 | 1.687 | 3.290 | 1,914 | 13,782 | 3 563 | ... | (h)4,502 | 2,772 | ... | 750 | ... | 8.024 | − 4,461 |
| Halifax ... ... | 27,116 | 8,306 | 15,263 | 18,976 | 69,661 | 36,312 | 51 | 10,159 | 10.562 | ... | 6,701 | 1,760 | 29.182 | + 7,181 |
| Ilford ... ... | 9,482 | 2,424 | 4,116 | 4,279 | 20,301 | 6,467 | 557 | 4,894 | 4,146 | ... | ... | ... | 9,040 | − 2,016 |
| Ilkeston ... ... | 2,359 | 579 | 1,613 | 1,476 | 6.027 | 662 | 157 | 1,578 | 1.644 | .. | ... | 210 | 3.432 | − 2,613 |
| Ipswich ... ... | 8.072 | 1,827 | 4,015 | 3,502 | 17,416 | 5,988 | ... | (h)3.642 | 2.078 | ... | ... | ... | 5,720 | + 268 |
| Keighley ... ... | 2.692 | 768 | 894 | 1,612 | 5.971 | 3,187 | 179 | 1,116 | 1.881 | ... | ... | (m) 369 | 3,366 | ... |
| Kilmarnock ... | 2,921 | 5.9 | 800 | 1.633 | 5.953 | 2,838 | ... | (h)1,623 | 1,233 | 3 | 1,160 | 28 | 4,047 | − 1,209 |
| Kirkcaldy ... ... | 4.728 | 1,158 | 1,525 | 2.636 | 10,047 | 6.159 | ... | 2,660 | 1,608 | ... | 410 | 110 | 4,788 | + 1,370 |
| Lancaster ... ... | 2,237 | 474 | 872 | 1,621 | 5.204 | 376 | 80 | 1,243 | 1,467 | ... | ... | ... | 2,710 | − 2,254 |
| Leith ... ... ... | 9.204 | 2.631 | 4.213 | 3,468 | 19,516 | 16,178 | 272 | (h)6.343 | 7.750 | 13 | ... | 70 | 14,176 | + 2,274 |
| Leyton ... ... | (p)21,929 | 6.544 | 11.592 | 12,875 | 52,940 | 17,427 | 133 | 10.018 | 8.064 | ... | ... | 228 | 18,340 | − 780 |
| Lincoln ... ... | 1,478 | 625 | 989 | 925 | 4.017 | 2,828 | 153 | 1,529 | 1,071 | ... | ... | ... | 2,600 | + 351 |
| Liverpool ... ... | 167.015 | 58,771 | 80.184 | 113,893 | 419.893 | 224.281 | 24.015 | 50,096 | 59,155 | ... | (d)66,929 | e) 5.217 | 181.397 | + 66,929 |
| Lowestoft ... ... | 3,285 | 796 | 2,115 | 2,813 | 9,009 | 1,789 | ... | (h) 2,261 | 1,562 | ... | ... | 350 | 4,173 | − 2,384 |
| Maidstone ... ... | 2,405 | 1,018 | 1,469 | 1,903 | 6.795 | 3,501 | 58 | 2,687 | 2,243 | ... | ... | 32 | 4,962 | − 1,468 |
| Manchester ... ... | 255,604 | 83,574 | 84,879 | 133,681 | 557,738 | 329,909 | 14,282 | 55,771 | 52,394 | 8,613 | 96,351 | (c 31,062 | 244,191 | + 100,000 |
| Nelson ... ... | 2,425 | 677 | 1,320 | 2,006 | 6,428 | 3,863 | ... | 1.008 | 966 | ... | ... | ... | 1,974 | + 1,899 |
| Newport (Mon.) ... | 10,254 | 4,009 | 10,364 | 7,014 | 31.671 | 6,879 | 808 | 5,817 | 4,197 | ... | ... | ... | 10.014 | − 2,327 |
| Nottingham ... | 43.601 | 15,142 | 18,684 | 30,847 | 108,274 | 58,886 | ... | 14,349 | 19,762 | ... | ... | ... | 34.111 | + 24,775 |
| Oldham ... ... | 25,759 | 7.792 | 18,416 | 21,470 | 73.437 | 37,140 | 1,474 | 15,796 | 11.822 | 1,099 | ... | (g) 7,762 | 36,479 | + 2,135 |
| Perth ... ... | 3,182 | 698 | 418 | 1,252 | 5,550 | 3,720 | 50 | 1,523 | 1,632 | 3 | 612 | ... | 3,770 | ... |
| Plymouth ... ... | 8.031 | 4,161 | 4,322 | 7,905 | 24.419 | 14.629 | 1,257 | 4,793 | 3,932 | ... | 4,465 | ... | 13,190 | + 2,696 |
| Pontypridd ... | 5,307 | 1.469 | 6,611 | 3,656 | 17.043 | 6.123 | 5 | (h)4.293 | 4.034 | ... | 590 | 41 | 8,958 | − 2,830 |
| Rawtenstall ... | 5,415 | 2,133 | 3,445 | 4,113 | 15,106 | 11,430 | (q)1,612 | 5,947 | 6,113 | ... | ... | ... | 12,060 | + 982 |
| Rochdale ... ... | 18,354 | 4,363 | 8,535 | 10,746 | 41,998 | 38,347 | 7,594 | 11,454 | 9,594 | 700 | 1,382 | (z)9,483 | 32,613 | + 13,328 |
| Rotherham ... ... | E 9,212<br>RT 557 | 2,778<br>273 | 5,711<br>633 | 8,591<br>369 | 26,292<br>1,832 | 13,966<br>625 | ... | 4,918<br>73 | 3,261 | ... | 5,037 | ... | 13,216<br>73 | + 780<br>+ 883 |
| Salford ... ... | 73,745 | 17,785 | 22,183 | 47,371 | 161.084 | 99,767 | 5,659 | 18,749 | 21.887 | 2,522 | 12,867 | (k)27,401 | 83,426 | + 22,000 |
| Southampton ... | 17.703 | 4,879 | 8,782 | 12.454 | 43.818 | 22.291 | 6,099 | 6.779 | 6,578 | 574 | ... | 488 | 14,419 | + 13,971 |
| Southend-on-Sea | 8,046 | 2.260 | 3,534 | 6,187 | 20,027 | 14,891 | 4,228 | (h) 3,834 | 1,753 | ... | 4,017 | ... | 9,605 | + 9,514 |
| Southport ... ... | 4,428 | 2,140 | 2,662 | 3.263 | 12.493 | 4.821 | 6,362 | 6,513 | 5,017 | ... | 1,977 | 628 | 14,135 | − 2,952 |
| South Shields ... | 7,929 | 3,263 | 2,659 | 5,370 | 19,221 | 14,931 | 313 | (h)5.488 | 3,438 | ... | ... | ... | 8,926 | + 6,318 |
| Staly'dge, H., M., D. | 12,148 | 4.018 | 6.273 | 6,445 | 28,884 | 6.754 | ... | (h) 7,711 | 7.308 | ... | 327 | 532 | 15.878 | − 9,124 |
| Stockport ... ... | 12,436 | 3,717 | 6,437 | 4,781 | 27,371 | 33,468 | 1,326 | 5,978 | 8,363 | 910 | 6,795 | 3,208 | 25.254 | + 9,540 |
| Sunderland ... | 18,431 | 4,552 | 4,670 | 11,268 | 38,921 | 29,950 | 252 | (h) 7,228 | 10,366 | 476 | 7,132 | ... | 25,202 | + 5,000 |
| Wallasey ... ... | 17,249 | 4,326 | 5,695 | 10,660 | 37,930 | 20,092 | 316 | 5,522 | 4,559 | ... | 634 | ... | 10,715 | + 9,693 |
| Walsall ... ... | 7.155 | 3,034 | 4.126 | 3,913 | 18.228 | 13.201 | 1,334 | 5.164 | 3,577 | 415 | 368 | 1,119 | 10.643 | + 3,892 |
| Walthamstow ... | 14,731 | 2,646 | 6,717 | 8,175 | 32,269 | 5.707 | 210 | (h)6.085 | 2.698 | ... | ... | ... | 8.783 | − 2,866 |
| Warrington ... | 5,529 | 1.779 | 4,255 | 3,235 | 14.798 | 8,407 | 408 | 2,580 | 3,254 | ... | ... | ... | 5,834 | + 2,981 |
| West Ham ... ... | 51.254 | 11.253 | 26,921 | 19,386 | 108,814 | 29,628 | 508 | 19,511 | 12.369 | 685 | ... | 959 | 33,524 | — 3,386 |
| Wigan ... ... | ... | ... | ... | ... | 41,318 | 31,465 | ... | 13.859 | 12.391 | ... | ... | 3.781 | ... | ... |
| Wolverhampton ... | 12.259 | 4,157 | 7,334 | 6,778 | 30.528 | 24,232 | (x) 1,131 | 7,788 | 5,146 | 100 | 4.915 | (a)3,637 | 21.586 | + 3,777 |
| Yarmouth (Gt.) ... | 7.443 | 1.867 | 2.634 | 4.388 | 16.332 | 7.801 | 95 | (h) 4.094 | 2.740 | ... | ... | ... | 6.834 | + 1,063 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | 75,856 | 13,642 | 32,519 | 23,887 | 143,884 | 110,492 | 1,363 | 45,900 | 24,541 | 2,023 | 13,000 | 1,628 | 87,092 | + 24,763 |
| Bexley ... ... | (s) 5,465 | 984 | 1,892 | 920 | 9,261 | 6,107 | ... | 2,942 | 2,325 | ... | 500 | ... | 5,767 | + 340 |
| Birkenhead ... | 16,099 | 4,011 | 10,380 | 9,371 | 39,861 | 25,706 | 86 | (h)11,537 | 9,501 | 269 | 4,302 | 183 | 25,792 | ... |
| Bournemouth ... | 22,307 | 6,912 | 9,107 | 13,967 | 52,293 | 43,719 | 723 | 10,733 | 15,371 | ... | ... | (e) 8,017 | 34,121 | + 10,321 |
| Cardiff ... ... | 37,582 | (c)11,176 | 15,351 | 20,184 | 84,293 | 66,333 | 1,732 | 24,138 | 22,801 | 800 | 6,946 | ... | 54,685 | + 13,380 |
| Coventry ... ... | 10,112 | 4,289 | 6,952 | 2,765 | 24,118 | 15,035 | 2,950 | 10,379 | 6,163 | ... | 1,258 | ... | 17,800 | + 185 |
| Glasgow ... ... | 305,400 | 122,812 | 142,988 | 48,147 | 619,347 | 392,197 | 58,631 | 81,774 | 97,077 | 13,388 | 215,757 | 9,829 | 417,825 | + 33,003 |
| Huddersfield ... | 26,892 | 6,064 | 22,638 | 9,933 | 65,527 | 44,182 | 61 | (h)11,749 | 10,904 | 1,630 | ... | ... | 24,283 | + 19,960 |
| Hull ... ... ... | 47,495 | 12,212 | 42,005 | 11,245 | 112,957 | 45,484 | 1,500 | 16,730 | 12,201 | 1,500 | (u)3,118 | ... | 33,549 | + 13,435 |
| Leeds ... ... | 109,413 | 36,055 | 39,894 | 28,455 | 213,817 | 197,714 | 7,511 | 42,197 | 49,923 | 5,021 | 41,752 | 4,957 | 143,850 | + 61,375 |
| Leicester ... ... | 47,876 | 9,447 | 22,023 | 15,633 | 95,029 | 52,642 | 2,312 | 23,252 | 12,095 | 1,939 | 7,668 | ... | 44,954 | + 10,000 |
| London ... ... | H 28,811<br>E 696,620 | 4,371<br>(r) 188,382 | 7,782<br>295,669 | (m)32,694<br>167,639 | 73,658<br>1,348,310 | def.11,966<br>946,179 | ...<br>29,440 | 334,173 | 369,356 | 22,858 | 138,152 | (l)26,529 | 891,068 | + 84,551 |
| N'castle-on-Tyne ... | 64,493 | 18,675 | 25,944 | 19,908 | 129,020 | 103,185 | 3,966 | 30,431 | 39,556 | 3,179 | ... | 6,796 | 79,962 | + 33,189 |
| Northampton ... | 7.254 | 3.080 | 2,489 | 3,563 | 16,386 | 11,763 | 279 | 3,481 | 4,312 | 323 | ... | (b)1,226 | 9,342 | + 2,700 |
| Portsmouth ... | 28,918 | 10,200 | 7,877 | 5,231 | 52,226 | 57,606 | 8,831 | 20,875 | 17,462 | 964 | 8,412 | 350 | 48,063 | + 18,374 |
| Preston ... ... | 10,781 | 4,592 | 6,263 | 2,429 | 24,065 | 19,205 | ... | 3,933 | 4,891 | ... | 3,649 | 1,358 | 13,831 | + 5,374 |
| Reading ... ... | 8,837 | 3,702 | 3,648 | 3,358 | 19,545 | 14,469 | ... | 6,714 | 4,662 | 291 | ... | ... | 11,667 | + 2,802 |
| Sheffield ... ... | 113,235 | 22,312 | 43,656 | 28,487 | 207,690 | 154,155 | 3,057 | 35,616 | 40,663 | 3,786 | 30,187 | 213 | 110,465 | + 46,748 |
| Wellington, N.Z. ... | 56,296 | 7,242 | 21,330 | 16,260 | 101,128 | 49,144 | 2,664 | 19,961 | 4,778 | ... | 14,068 | 4,702 | 43,509 | + 8,299 |

(a) Includes £1,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £17,178. (s) Including £2,128 through-running expenses.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £6,469 rent of leased lines. † This item includes £731 payable to Sinking Fund of Hurst U.D.C.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Appropriation of Net Surplus. | | | Receipts per Car Mile. | | Operating Expenses per Car Mile. | | | | | Percentage of Operating Expenses to Total Revenue. | Average Operating Expenses per Car Mile (excludi'g Power Costs). | Board of Trade Units. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carried Forward. | Reserve. | Contribution to Rates or Municip'l Funds. | Average Total per Car Mile. | Average Traffic per Car Mile. | Traffic. | General. | Repairs and Maintenance. | Power. (Price paid) | Total. | | | Units. | Cost per Unit. | Units used per car mile. |
| | | | | d. | d. | d. | d. | d. | d. | d. | % | d. | | d. | |
| Aberdeen ... | ... | 12,525 | ... | 11·06 | 10·92 | 2·859 | 1·298 | ·822 | ·985 | 5·964 | 53·89 | 4·979 | 2,110,964 | ·81 | 1·21 |
| Accrington ... | 460 | 3,359 | 724 | 12·57 | 12·38 | 3·03 | ·84 | ·95 | 2·10 | 6·98 | 55·55 | 4·88 | 907,721 | 1·24 | 1·70 |
| Ashton-u-Lyne ... | ... | ... | 1,350 | 11·475 | 11·186 | 2·463 | ·899 | 1·236 | 1·691 | 6·289 | 54·801 | 4·598 | 619,289 | 1·25 | 1·353 |
| Ayr... ... ... | ... | 1,175 | ... | 10·13 | 9·713 | 2·16 | 1·23 | ·99 | 1·24 | 5·62 | 55 | 4·35 | 378,570 | 1·26 | ·98 |
| Birmingham ... | ... | 45,000 | 56,352 | 10·62 | 10·492 | 2·929 | ·747 | 1·248 | 1·840 | 6·764 | 63·6 | 4·924 | 21,594,889 | 1·119 | 1·64 |
| Blackburn ... | 3,870 | ... | ... | 14·02 | 13·34 | 3·12 | ·90 | 2·61 | 2·31 | 8·94 | 56·84 | 6·63 | 2,030,535 | 1·3 | 1·81 |
| Blackpool ... | ... | 2,667 | 7,664 | 16·93 | 16·71 | 3·64 | 1·17 | 2·12 | 2·12 | 9·05 | 53·50 | 6·95 | 1,400,209 | 1·587 | 1·33 |
| Bolton ... ... | 443 | ... | 14,500 | 11·558 | 11·447 | 2·525 | ·733 | 1·354 | 1·674 | 6·286 | 54·915 | 4·612 | 4,315,448 | 1·1 | 1·52 |
| Bradford ... ... | ... | ... | 9,000 | 12·021 | 11·314 | 3·366 | ·983 | 1·859 | 1·860 | 8·068 | 67·051 | 5·687 | 11,126,989 | 1 | 1·863 |
| Brighton ... ... | 932 | ... | ... | 11·545 | 11·112 | 3·071 | ·864 | 2·758 | 1·785 | 8·478 | 73·43 | 6·693 | 1,663,126 | 1·2 | 1·49 |
| Burnley ... ... | ... | 5,791 | 8,750 | 13·226 | 13·185 | 3·098 | ·878 | 1·577 | 2·630 | 8·183 | 61·85 | 5·55 | 3,079,155 | 1·214 | 2·11 |
| Burton-on-Trent ... | ... | ... | ... | 8·61 | 7·90 | 2·81 | ·73 | 1·45 | 1·42 | 6·41 | 78·7 | 4·99 | 515,622 | 1·39 | 1·01 |
| Bury ... ... | ... | (b)4,572 | 5,000 | 10·22 | 10·04 | 2·214 | ·685 | 1·152 | 1·290 | 5·341 | 49·91 | 4·051 | 2,039,011 | 1·081 | 1·271 |
| Chester ... ... | ... | ... | ... | 8·81 | 8·50 | 2·32 | 1·09 | ·61 | 1·52 | 5·54 | 63 | 4·02 | 385,132 | 1·33 | 1·11 |
| Chesterfield ... | ... | 820 | ... | 10·51 | 10·12 | 2·27 | 1·02 | 1·58 | 1·75 | 6·62 | 62·9 | 4·87 | 405,096 | 1·25 | 1·39 |
| Colchester ... | ... | ... | ... | 7·98 | 7·627 | 2·096 | ·882 | 1·313 | 1·86 | 6·151 | 76·74 | 4·291 | 401,208 | 1·5 | 1·24 |
| Croydon ... ... | ... | 7,586 | 3,000 | 8·381 | 8·207 | 2·763 | ·637 | 1·224 | 1·499 | 6·123 | 70·91 | 4·497 | 2,484,993 | 1·604 | ·938 |
| Darlington ... | ... | ... | ... | 7·651 | 7·441 | 2·633 | ·480 | 1·202 | 1·222 | 5·537 | 72·36 | 4·315 | 466,784 | 1 | 1·222 |
| Darwen ... ... | 106 | ... | ... | 14·218 | 14·204 | 3·771 | ·783 | 2·833 | 2·396 | 9·783 | 64·30 | 7·387 | ... | ... | ... |
| Derby ... ... | 6,059 | ... | ... | E 9·884 | 9·671 | 3·385 | ·541 | ·985 | 1·694 | 6·605 | 66·8 | 4·911 | 1,357,232 | 1·45 | 1·168 |
| | | | | H. 5·649 | 5·347 | 8·564 | ... | ·994 | ... | 9·558 | 169·4 | ... | ... | ... | ... |
| Doncaster ... | ... | 1,290 | ... | 9·41 | 9·25 | 2·03 | ·54 | 2·18 | 1·65 | 6·40 | 69·1 | 4·75 | 683.651 | 1·25 | 1·32 |
| Dundee ... ... | ... | 10 | 1,500 | 11·480 | 11·189 | 2·908 | ·989 | 1·257 | 1·803 | 6·957 | 60·6 | 5·154 | 2,451,897 | 1 | 1·803 |
| East Ham ... | ... | ... | ... | 10·06 | 9·95 | 3·02 | 1·10 | 2·04 | 1·76 | 7·92 | 78·8 | 6·16 | 2,139,401 | 1·125 | 1·55 |
| Exeter ... | ... | 2,043 | ... | 9·272 | 9 272 | 2·498 | ·650 | ·726 | 1·937 | 5·811 | 62·67 | 3·874 | 516,793 | 1·625 | 1·192 |
| Gloucester ... | ... | ... | ... | 6·618 | 6·173 | 2·630 | ·644 | 1·255 | ·730 | 5·259 | 79 | 4·529 | 480,442 | 1 | ·73 |
| Halifax ... ... | ... | ... | 7,181 | 11·816 | 11·702 | 3·023 | ·926 | 1·702 | 2·116 | 7·767 | 65 | 5·65 | 3,900,902 | 1·125 | 1·81 |
| Ilford ... ... | ... | ... | ... | 7·616 | 7·464 | 2·698 | ·689 | 1 171 | 1·218 | 5·776 | 76·4 | 4·558 | 960,866 | 1·07 | 1·098 |
| Ilkeston ... ... | ... | ... | ... | 6·73 | 6·57 | 2·36 | ·58 | 1·63 | 1·49 | 6·06 | 90·25 | 4·57 | 339,920 | 1·042 | 1·4 |
| Ipswich ... ... | 268 | ... | ... | 8·408 | 8·110 | 2·900 | ·657 | 1·442 | 1·258 | 6·257 | 74·41 | 4·999 | 672,411 | 1·25 | 1·007 |
| Keighley ... ... | ... | ... | ... | 9·054 | 8·754 | 2·664 | ·761 | ·890 | 1·595 | 5·910 | 65 | 4·315 | 254,636 | 1·5 | 1·05 |
| Kilmarnock ... ... | ... | ... | ... | 7·09 | 6·89 | 2·357 | ·482 | ·646 | 1·317 | 4·802 | 66·3 | 3·487 | 313,550 | 1·25 | 1·06 |
| Kirkcaldy ... | 1,370 | ... | ... | 8·22 | 7·97 | 2·398 | ·587 | ·774 | 1·337 | 5·096 | 63·95 | 3·75 | 632,581 | 1 | 1·337 |
| Lancaster ... ... | ... | ... | ... | 7·92 | 7·61 | 3·130 | ·664 | 1·221 | 2·269 | 7·284 | 91 | 5·015 | 228,902 | 1·7 | 1·33 |
| Leith ... ... | 2,274 | ... | ... | 9·07 | 8·81 | 2·34 | ·67 | 1·07 | ·88 | 4·96 | 54·67 | 4·08 | 899,191 | ·92 | ·98 |
| Leyton ... ... | ... | ... | ... | 9·368 | 9·161 | (c) 2·920 | ·871 | 1·543 | 1·714 | 7·048 | 73·092 | 5·374 | 2,911,345 | 1·037 | 1·615 |
| Lincoln ... ... | 381 | ... | ... | 10·24 | 10·05 | 2·21 | ·94 | 1·47 | 1·38 | 6·00 | 58·7 | 4·62 | 183,807 | 1·25 | 1·107 |
| Liverpool ... | ... | ... | 66,929 | 12·03 | 12·28 | 3·184 | 1·120 | 1·529 | 2·171 | 8·004 | 63·6 | 5·833 | ... | ... | ... |
| Lowestoft ... | ... | ... | ... | 8·3 | 8·3 | 2·5 | ·6 | 1·6 | 2·18 | 6·9 | 83·40 | 4·8 | 385,731 | 1·75 | 1·2 |
| Maidstone ... | ... | ... | ... | 8·36 | 7·93 | 1·96 | ·82 | 1·19 | 1·55 | 5·52 | 69·58 | 3·97 | 365,309 | 1·25 | 1·236 |
| Manchester ... | ... | ... | 100.000 | 11·351 | 11·202 | 3·269 | 1·069 | 1·085 | 1·709 | 7·132 | 62·83 | 5·423 | 30,492,127 | 1·046 | 1·625 |
| Nelson ... ... | 1,889 | ... | ... | 12·29 | 12·23 | 2·89 | ·81 | 1·58 | 2·39 | 7·67 | 62 | 5·28 | 240,804 | 2 | 1·2 |
| Newport (Mon.)... | ... | ... | ... | 9·557 | 9·310 | 2·542 | ·994 | 1·570 | 1·746 | 7·852 | 82·26 | 6·106 | 1,239,245 | 1·28 | 1·28 |
| Notti ngham ... | ... | 5,775 | 19,000 | 11·50 | 11·34 | 3·00 | 1·05 | 1·29 | 2·11 | 7·45 | 64·19 | 5·39 | 5,761,096 | 1·25 | 1·65 |
| Oldham ... ... | ... | 2,135 | ... | 12·946 | 12·645 | 3·016 | ·912 | 2·156 | 2·514 | 8·598 | 66·41 | 6·084 | 3,435,211 | 1·49 | 1·675 |
| Perth ... ... | ... | ... | ... | 8·79 | 8·31 | 3·02 | ·66 | ·39 | 1·19 | 5·26 | 59 | 4·07 | 277,474 | 1·08 | 1·09 |
| Plymouth ... | ... | ... | 2,696 | 11·790 | 11·094 | 2·349 | 1·217 | 1·264 | 2·312 | 7·142 | 62·53 | 4·830 | 1,139,761 | 1·667 | 1·38 |
| Pontypridd ... | ... | ... | ... | 10·92 | 10·78 | 2·71 | ·75 | 3·37 | 1·87 | 8·70 | 80·65 | 6·83 | 701,941 | 1·25 | 1·49 |
| Rawtenstall ... | ... | 982 | ... | 11·49 | 11·01 | 2·35 | ·92 | 1·49 | 1·78 | 6·54 | 56·69 | 4·76 | 734,781 | 1·38 | 1·33 |
| Rochdale... ... | 7,423 | 5,904 | ... | 11·019 | 10·980 | 2·524 | ·610 | 1·193 | 1·560 | 5·887 | 52·3 | 4·327 | 2,566,554 | 1·005 | 1·553 |
| Rotherham ... | E. ... | ... | 750 | 12·55 | 12·50 | 2·86 | ·86 | 1·77 | 2·67 | 8·16 | 65·31 | 5·49 | 1,499,517 | 1·373 | 1·94 |
| | R.T 552 | ... | ... | 10·36 | 10·36 | 2·35 | 1·15 | 2·66 | 1·56 | 7·72 | 74·56 | 6·16 | 64,520 | 1·375 | 1·13 |
| Salford ... ... | ... | ... | 22,000 | 10·692 | 10·673 | 3·023 | ·729 | ·909 | 1·942 | 6·603 | 62 | 4·661 | 9,260,898 | 1·227 | 1·600 |
| Southampton ... | 8,971 | ... | 5.000 | 10·672 | 10·307 | 2·857 | ·788 | 1·418 | 2·010 | 7·073 | 66·3 | 5·063 | 1,874,217 | 1·625 | 1·266 |
| Southend-on-Sea | 2,514 | 1,000 | 6,000 | 13·14 | 12·97 | 3·03 | ·85 | 1·33 | 2·33 | 7·54 | 57·35 | 5·21 | 848.538 | 1·75 | 1·33 |
| Southport ... ... | ... | ... | ... | 9·595 | 9·381 | 2·454 | 1·186 | 1·475 | 1·808 | 6·923 | 72·1 | 5·101 | 513,285 | 1·5 | 1·185 |
| South Shields ... | (d) 500 | 4,218 | 1,600 | 10·066 | 9·919 | 2·253 | ·885 | ·729 | 1·566 | 5·433 | 56·28 | 4·077 | 914,188 | 1·407 | 1·122 |
| Stalybridge, &c. | ... | ... | ... | 7·880 | 7·729 | 2·686 | ·887 | 1·387 | 1·425 | 6·385 | 81·33 | 4·960 | 1,719.696 | ·9 | 1·584 |
| Stockport ... | ... | 540 | 9,000 | 10·434 | 10·221 | 2·133 | ·638 | 1·103 | ·820 | 4·694 | 44·99 | 3·874 | 1,701,943 | 1·036 | 1·218 |
| Sunderland ... | ... | ... | 5,000 | 11·208 | 11·149 | 2·999 | ·741 | ·760 | 1·834 | 6·334 | 55·81 | 4·50 | 1,764,971 | 1·5 | 1·19 |
| Wallasey ... | ... | 2,500 | 7,500 | 11·035 | 10·928 | 3·280 | ·823 | 1·083 | 2·028 | 7·214 | 65·3 | 5·18 | 1,827,115 | 1·4 | 1·45 |
| Walsall ... ... | 3,392 | ... | 500 | 11·326 | 11·038 | 2·578 | 1·094 | 1·487 | 1·410 | 6·569 | 58 | 5·159 | 780,825 | 1·25 | 1·172 |
| Walthamstow ... | ... | ... | ... | 7·92 | 7·76 | 3·07 | ·55 | 1·40 | 1·71 | 6 73 | 84·97 | 5·02 | 1,426,964 | 1·375 | 1·24 |
| Warrington ... | 1,481 | ... | 1,500 | 12·398 | 12·237 | 2·954 | ·950 | 2·273 | 1·728 | 7·906 | 64 611 | 6·177 | 517,587 | 1·50 | 1·152 |
| West Ham ... | ... | ... | ... | 9·43 | 9·329 | 3·554 | ·761 | 1·823 | 1·313 | 7·451 | 78 | 6·038 | 6,103,884 | ·75 | 1·72 |
| Wigan ... ... | ... | ... | ... | 12·05 | 11·80 | ... | ... | ... | ... | 6·84 | 56·77 | 5·03 | 2,132,384 | ... | 1·471 |
| Wolverhampton ... | ... | ... | 3,777 | 11·250 | 11·086 | 2·518 | ·854 | 1·507 | 1·393 | 6·272 | 55·75 | 4·879 | 1,620,970 | 1 | 1·388 |
| Yarmouth (Gt.)... | 1,062 | ... | ... | 8·605 | 8·425 | 2·655 | ·666 | ·938 | 1·564 | 5·823 | 67·95 | 4·259 | 655,315 | 1·60 | ·974 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | * | | | | | Works Cost. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... ... | ... | ... | 24,763 | 10·27 | 10·12 | 2·98 | ·55 | 1·31 | ·96 | 5·80 | 56·33 | 4·83 | 9,733,420 | ·589 | 1·40 |
| Bexley ... ... | 40 | ... | ... | 12·8 | 12·63 | 3·04 | ·89 | 1·75 | ·87 | 6·55 | 60·3 | 5·68 | 350,103 | ·63 | 1·37 |
| Birkenhead ... | ... | ... | ... | 12·075 | 11·89 | 3·128 | ·779 | 2·016 | 1·141 | 7·064 | 58·49 | 5·923 | 2,490,713 | ·565 | 2·016 |
| Bournemouth ... | ... | 10,321 | ... | 12·24 | 12·20 | 2·85 | ·88 | 1·16 | (b) 1·78 | 6·67 | 54·46 | 4·83 | 2,917,309 | ·583 | 1·55 |
| Cardiff ... ... | 3,980 | ... | 9,400 | 12·014 | 11·83 | 3·449 | 1 026 | 1·409 | ·679 | 6·563 | 56 | 5·884 | 4,015,405 | ·438 | 1·54 |
| Coventry ... | 185 | ... | ... | 9·451 | 9·414 | 2·441 | 1·035 | 1·678 | ·668 | 5·822 | 61·6 | 5·154 | 1,533,212 | ·450 | 1·44 |
| Glasgow ... ... | ... | ... | 33,003 | 10·404 | 10·364 | 3·141 | 1·263 | 1·471 | ·495 | 6·370 | 57·88 | 5·875 | 32,280,346 | ·358 | 1·38 |
| Huddersfield ... | ... | 13.370 | 6,590 | 11·04 | 10·73 | 2·70 | ·61 | 2·28 | 1·00 | 6·59 | 59·73 | 5·59 | 5,413,488 | ·42 | 2·27 |
| Hull ... ... | ... | 1,435 | 12,000 | 9·42 | 9·33 | 2·82 | ·68 | 2·46 | ·67 | 6·63 | 71·04 | 5·96 | 4,855,082 | ·67 | 1·31 |
| Leeds ... ... | ... | ... | 61,375 | 11·229 | 11·120 | 2·985 | ·984 | 1·089 | ·776 | 5·834 | 51·95 | 5·058 | 16,461,894 | ·440 | 1·807 |
| Leicester... ... | ... | ... | 10,000 | 9·675 | 8·843 | 3·137 | ·622 | 1·443 | 1·024 | 6·226 | 64 | 5·202 | 6,558,800 | ·3645 | 1·79 |
| London ... ... | ... | H.84,551 | ... | H. 8·81 | 8·62 | 4·12 | ·62 | 1·11 | 4·67 | 10·52 | 119·40 | 10·52 | ... | ... | ... |
| | | | | E.11·29 | 10·98 | 3·42 | ·93 | 1·45 | ·83 | 6·63 | 58·76 | 5·80 | 122,307,298 | ·61 | 2·51 |
| N'castle-on-Tyne | ... | 21.189 | 12,000 | 11·958 | 11·451 | 3·238 | ·937 | 1·302 | 1·000 | 6·477 | 52·57 | 5·477 | 9,426,563 | ·394 | 1·972 |
| Northampton ... | 500 | 1,200 | 1,000 | 10·35 | 10·21 | 2·72 | 1·15 | ·93 | 1·34 | 6·14 | 58 | 4·80 | 934,809 | ·91 | 1·46 |
| Portsmouth ... | 11,374 | (f) 5.000 | 4.000 | 12·229 | 12 035 | 3·220 | 1·136 | ·877 | ·582 | 5·815 | 47·55 | 5·233 | 2,599.210 | ·543 | 1·206 |
| Preston ... ... | ... | 5,374 | ... | 10·698 | 10·50 | 2·665 | 1·135 | 1·550 | ·600 | 5·95 | 55·63 | 5·35 | 1,516,545 | ·384 | 1·309 |
| Reading ... ... | ... | 2,802 | ... | 8·920 | 8·650 | 2·319 | ·970 | ·957 | ·880 | 5·126 | 57 | 4·246 | 1,033,313 | ·70 | ·99 |
| Sheffield ... ... | ... | 7,032 | 37.716 | 10·760 | 10·665 | 3·367 | ·664 | 1·298 | ·847 | 6·176 | 57·389 | 5·329 | 16.500.208 | ·673 | 1·837 |
| Wellington, N.Z. | 8,299 | ... | ... | 15·654 | 15·568 | 5·864 | ·755 | 2·222 | 1·694 | 10·535 | 67·3 | 8·841 | 4,9[illegible] | ·80 | 2·13 |

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·88 per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·0331. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (f) Including Insurance.

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# RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

## Specially Compiled for "The Tramway and Railway World."

### TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

| Name. | Population Served. | Car Mileage. | Passengers Carried. | Traffic Records. Passengers Carried per Car Mile. | Average Fare per Passenger. d | Average Journeys per Head of Populat'n per Annum. | Average Car Miles per Day per Car. | Traffic Revenue per Mile of Single Track. £ | Average Traffic Revenue per Annum per Head of Populat'n Served. | Operating Expenses per Passenger. d. | Average Distance of 1d. Fare. Miles. | Average Fare Charged per Mile. d. | Average Speed per Hour. Miles. | Average Total Car Hours per Day. | Average Number of Cars in Use Daily. | Number of Cars in Stock. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aberdeen ... | 165,000 | 1,738,966 | 19,990,711 | 11·49 | ·95 | 121·15 | 105·8 | 2,930 | 9/6 | ·519 | 1·69 | ·6 | 7·5 | 655 | 45 | 77 |
| Accrington... | 70,000 | 831,356 | 4,577,019 | 8·6 | 1·43 | 65·3 | 105 | 2,572 | 7/10 | ·81 | 1·07 | ·929 | 7·5 | 242 | 17 | 27 |
| Ashton-u-L. | 50,000 | 457,856 | 4,751,139 | 10·383 | 1·077 | 95·083 | 104 | 2,606 | 8/6 | ·606 | 1·223 | ·81 | 8 | 204 | 12 | 21 |
| Ayr ... ... | 33,000 | 385,986 | 3,880,850 | 10·05 | ·96 | 117 | 106 | 2,079 | 9 6 | ·558 | 1·25 | ·75 | 8 | 140 | 10 | 20 |
| Birmingham | est.850,000 | 13,134,642 | 134,467,166 | 10·23 | 1·025 | 158 | 81·06 | 5,298 | 13/6 | ·66 | 2·34 | ·365 | 7·5 | 5,063 | 485 | 511 |
| Blackburn ... | 200,000 | 1,141,161 | 11,721,367 | 10·88 | 1·27 | 58·61 | 105 | 2,564 | 6/4 | ·87 | 1·25 | ·76 | 7·50 | 434 | 31 | 61 |
| Blackpool ... | 67,500 | 1,050,115 | 12,452,820 | 12 | 1·41 | 184·48 | 89·6 | 4,321 | 21/8 | ·765 | ... | ... | 8 | ... | 32 | 72 |
| Bolton ... | 221,000 | 2,831,003 | 30,287,673 | 10·69 | 1·065 | 137·04 | 121·66 | 2,875 | 12/3 | ·588 | 1·468 | ·627 | 7·25 | 1,030 | 60 | 105 |
| Bradford ... | 354,000 | 5,971,561 | 62,005,976 | 10·383 | 1·086 | 175 | 113 | 2,703 | 15/11 | ·776 | 1·63 | ·504 | 7·3 | 2,232 | 144 | 242 |
| Brighton ... | 132,265 | 1,118,309 | 11,312,855 | 10 | 1·09 | 85·55 | 82·83 | 3,012 | 7/11 | ·84 | 1·27 | ·788 | 6·41 | 544 | 34 | 50 |
| Burnley ... | 175,000 | 1,449,647 | 15,949,359 | 11 | 1·18 | 91 | 95 | 3,620 | 9/1 | ·744 | 1·25 | ·83 | 7 | 760 | 40 | 57 |
| Burton ... | 48,000 | 437,106 | 3,188,655 | 7·30 | 1·082 | 66 | ... | 1,684 | 5·10 | ·928 | 1·505 | ·58 | 7·5 | ... | ... | 20 |
| Bury ... ... | 128,202 | 1,599,872 | 15,132,553 | 9 | 1·07 | 118·03 | 102·33 | 1,957 | 10·6 | ·535 | 1·24 | ·85 | 8·56 | 506·64 | 42·71 | 54 |
| Chester ... | 39,028 | 346,645 | 3,067,815 | 8·85 | ·96 | 78·6 | 95 | 1,906 | 6/4 | ·626 | 1·27 | ·8 | 7 | 150·60 | 10·04 | 18 |
| Chesterfield | 38,000 | 289,745 | 2,631,398 | 9·08 | 1·1 | 69 | 122 | 2,407 | 6/8 | ·728 | 1·38 | ·75 | 7·33 | 126 | 7 | 14 |
| Colchester ... | 44,160 | 323,524 | 1,871,876 | 5·79 | 1·32 | 42·39 | 89·3 | 1,295 | 4/8 | 1·06 | ·85 | 1·09 | 6·81 | 157·92 | 9·87 | 18 |
| Croydon ... | 170,451 | 2,657,824 | 20,501,143 | 7·74 | 1·06 | 120·29 | 125 | 4,734 | 10 7 | ·775 | 2·15 | ·50 | 7·92 | 915·82 | 58 | 75 |
| Darlington... | 58,000 | 381,920 | 3,791,835 | 9·9 | ·75 | 65·38 | 95·1 | 1,345 | 4/1 | ·557 | 1·219 | ·45 | 6·66 | 151·25 | 11 | 16 |
| Darwen ... | 40,611 | 252,710 | 2,755,011 | 10·91 | 1·24 | 67·83 | ... | 1,989 | 7/- | ·864 | ... | ... | ... | ... | ... | ... |
| Derby ... | 124,000 | E 1,161,854 | 10,857,834 | 9·345 | 1·035 | 87·56 | ... | 2,122 | 7/7 | ·707 | 1·44 | ·75 | 6·375 | ... | ... | 50 |
| | | H. 17,674 | 98,230 | 5·558 | ·962 | | | ... | ... | 1·36 | 1 | 1 | ... | ... | ... | 3 |
| Doncaster ... | 52,000 | 516,540 | 5,072,172 | 9·81 | ·952 | 97·54 | 103 | 1,591 | 7/8 | ·652 | 1·25 | ·76 | 7·5 | 218 | 16 | 25 |
| Dundee ... | 165,000 | 1,359,821 | 17,734,162 | 13·04 | ·857 | 107 | ... | 2,305 | 7/8 | ·533 | 2 | ·50 | 7·3 | ... | ... | 68 |
| East Ham ... | 130,000 | 1,375,433 | 17,775,698 | 12·92 | ·77 | 132 | ... | 5,101 | 8 9 | ·61 | 1·10 | ·65 | ... | ... | ... | 45 |
| Exeter ... | 48,660 | 433,507 | 4,110,513 | 9·18 | ·98 | 84·48 | ... | 2,392 | 6/11 | ·612 | 1 | 1 | 6 | ... | 16 | 20 |
| Gloucester ... | 53,972 | 628,946 | 4,200,432 | 6·7 | ·92 | 77 | 90·75 | 1,078 | 6/- | ·78 | 1·5 | ·65 | 6·78 | 260·3 | 19 | 30 |
| Halifax ... | 176,000 | 2,152,391 | 19,456,923 | 9·04 | 1·27 | 110 | 79·5 | 1,912 | 11/11 | ·86 | 1·35 | ·84 | 6·8 | 814 | 74 | 95 |
| Ilford ... | 82,000 | 843,517 | 7,578,813 | 8·79 | ·831 | 92·42 | ... | 2,312 | 5/1 | ·64 | 1·843 | ·69 | 8 | ... | ... | 26 |
| Ilkeston ... | 32,000 | 238,645 | 1,732,846 | 7·25 | ·9 | 54 | 117 | 1,713 | 6/1 | ·836 | 3·2 | ·35 | 7·5 | 108 | 7·5 | 13 |
| Ipswich ... | 75,300 | 668,025 | 5,554,585 | 8·31 | ·975 | 73·76 | 65·5 | 1,518 | 6/- | ·75 | 1·53 | ·693 | 6·17 | 234·19 | 20·78 | 36 |
| Keighley ... | 43,000 | 242,500 | 3,099,272 | 12·8 | ·68 | 72·08 | 55·35 | 1,447 | 4/1 | ·462 | 2·22 | ·45 | 6·67 | 126 | 7 | 12 |
| Kilmarnock ... | 36,000 | 297,557 | 2,317,709 | 7·78 | ·879 | 64·38 | 90·05 | 1,537 | 4/8 | ·616 | 1·13 | ·86 | 7·22 | 112·58 | 9·05 | 14 |
| Kirkcaldy ... | 39,600 | 473,089 | 5,237,947 | 11·07 | ·719 | 132·27 | 59 | 1,786 | 7/11 | ·46 | 1·522 | ·64 | 7·5 | 195 | 15 | 22 |
| Lancaster ... | 41,414 | 171,475 | 1,461,104 | 8·52 | ·893 | 35 | 75 | 1,132 | 2 8 | ·854 | 1·71 | ·5 | 8 | 88·2 | 6·3 | 12 |
| Leith ... | 110,400 | 944,329 | 9,706,611 | 10·28 | ·87 | 87·92 | 125 | 1,926 | 6/3 | ·482 | 1·32 | ·72 | 8·3 | 311 | 20·66 | 37 |
| Leyton ... | 124,735 | 1,802,647 | 17,476,453 | 9·69 | ·945 | 140 | 112 | 3,719 | 11/- | ·727 | ... | ... | 8 | ... | ... | 60 |
| Lincoln ... | 20,000 | 160,446 | 1,733,259 | 10·8 | ·92 | 86·66 | 64·08 | 2,264 | 6.8 | ·556 | 1·75 | ·428 | 7 | 90 | 5 | 8 |
| Liverpool ... | ... | 12,590,408 | 134,249,967 | 10·66 | 1·128 | ... | ... | 5,303 | ... | ·756 | 2·45 | ... | ... | ... | 445 | 587 |
| Lowestoft ... | 35,000 | 308,897 | 2,462,188 | 8 | 1·05 | 70·35 | ... | 2,646 | 6/2 | ·878 | univ'rs'l p | enny fare | ... | ... | ... | 19 |
| Maidstone ... | 25,000 | 295,438 | 2,224,200 | 7·528 | 1·053 | 88·968 | 81 | 1,387 | 7/1 | ·73 | 1 | 1 | 6·7 | 128 | 12 | 19 |
| Manchester | 950,000 | 18,768,259 | 187,675,185 | 10 | 1·12 | 198 | 95·8 | 4,990 | 17/5 | ·713 | 2·368 | ·422 | 7·25 | ... | 537 | 629 |
| Nelson ... | 45,000 | 200,996 | 2,776,785 | 13·82 | ·88 | 61·71 | 94·09 | 2,650 | 4/4 | ·555 | 1 | 1 | 5·50 | 108 | 6 | 11 |
| Newport ... | 87,626 | 968,067 | 9,251,181 | 9·56 | ·973 | 105·6 | ... | 2,617 | 8/7 | ·821 | 1·75 | ... | ... | ... | 37 | 44 |
| Nottingham | 260,000 | 3,485,789 | 38,484,032 | 11·04 | 1·02 | 148 | 92·08 | 4,514 | 12/8 | ·67 | 1·68 | ·65 | 6·86 | ... | 104 | 135 |
| Oldham ... | 180,000 | 2,019,916 | 21,435,727 | 10·457 | 1·19 | 119·087 | 109·5 | 2,962 | 12·- | ·822 | 1·115 | ·884 | 6·84 | 820 | 51·25 | 92 |
| Perth .. ... | 35,900 | 252,940 | 1,813,228 | 7·16 | 1·15 | 50·5 | 96·25 | 1,258 | 4/7 | ·73 | ... | ... | 6·25 | 120 | 8 | 12 |
| Plymouth ... | 112,000 | 820,406 | 8,839,974 | 10·77 | 1·029 | 78·92 | ... | 2,528 | 6/9 | ·663 | ... | ... | ... | ... | ... | 42 |
| Pontypridd... | 40,000 | 470,215 | 4,721,110 | 10·04 | 1·07 | 118 | 83·4 | 2,457 | 10/7 | ·77 | 1·25 | ·51 | 6·5 | 234 | 18 | 26 |
| Rawtenstall | 50,000 | 353,813 | 4,949,775 | 8·93 | 1·23 | 98·72 | 126 | 1,600 | 10/2 | ·73 | 1·12 | ·28 | 9 | 198 | 12 | 24 |
| Rochdale ... | 130,000 | 1,749,967 | 13,740,152 | 7·91 | 1·38 | 105·7 | 114·90 | 2,008 | 12.4 | ·734 | 1·07 | ·90 | 7·66 | 645 | 43 | 69 |
| Rotherham... | 64,000 | E 772,610 | 8,774,539 | 11·35 | 1·104 | 137·12 | ... | 3,352 | 12.7 | ·719 | ... | ... | ... | ... | ... | ... |
| | | RT 56,287 | 191,088 | 3·36 | 3·08 | ... | ... | ... | ... | 2·3 | ... | ... | ... | ... | ... | ... |
| Salford ... | 350,000 | 5,854,830 | 50,113,120 | 8·559 | 1·243 | 143 | 111 | 3,425 | 14/10 | ·77 | 1·85 | ·85 | 7·853 | 2,075·18 | 144 | 200 |
| Southampt'n | 122,200 | 1,486,746 | 12,348,658 | 8·306 | 1·241 | 101 | ... | 3,592 | 10 5 | ·85 | ... | ... | ... | ... | ... | 68 |
| Southend ... | 78,000 | 637,366 | 7,581,104 | 11·89 | 1·09 | 97·2 | 87 | 4,708 | 8/10 | ·634 | 1·41 | ·76 | 6·5 | 357 | 21 | 31 |
| Southport ... | 31,312 | 433,068 | 4,401,336 | 10·63 | ·923 | 140·5 | 103 | 1,574 | 10/10 | ·68 | 1·6 | ·62 | 6·65 | 217·5 | 13·5 | 26 |
| So'th Shields | 110,513 | 814,212 | 8,456,688 | 10·386 | ·912 | 76·5 | 129·2 | 3,332 | 6'1 | ·545 | 1·825 | ·54 | 7·61 | 282 | 16 | 35 |
| Stalybridge | 92,933 | 1,085,545 | 8,896,836 | 8·123 | ·943 | 95·7 | ... | 1,280 | 7/6 | ·779 | 1·275 | ·784 | 6·8 | ... | ... | 60 |
| Stockport | 120,000 | 1,399,314 | 10,665,098 | 7·6 | 1·341 | 88·8 | 76·6 | 2,158 | 9/11·3 | ·615 | 1·25 | ·72 | 7·5 | 465 | 38 | 50 |
| Sunderland | 170,000 | 1,474,637 | 16,972,537 | 11·5 | ·968 | 99·8 | 79·3 | 3,366 | 8/1 | ·550 | 1·34 | ·68 | 7 | 672 | 42 | 70 |
| Wallasey ... | 83,000 | 1,261,855 | 12,352,000 | 9·78 | 1·11 | 148·94 | 98·7 | 2,893 | 13/10 | ·99 | 1·89 | ·54 | 7 | ... | ... | 61 |
| Walsall ... | 100,000 | 665,964 | 5,683,798 | 8·535 | 1·293 | 87 | 57 | 1,750 | 6·1 | ·769 | 1·24 | ·77 | 7 | 315 | 21 | 39 |
| Walth'mst'w | 128,000 | 1,151,029 | 11,807,549 | 10·258 | ·756 | 91·89 | 93 | 2,968 | 5/11 | ·655 | 1·15 | ·89 | 7·2 | 408 | 36 | 38 |
| Warrington | 86,000 | 449,206 | 6,064,139 | 13·5 | ·906 | 70·513 | 102·533 | 2,372 | 5/4 | ·584 | 1·246 | ·803 | 6·408 | 192·048 | 12·003 | 21 |
| West Ham .. | 294,200 | 3,544,292 | 40,200,317 | 11·34 | ·822 | 136 | 98 | 4,592 | 9·4 | ·65 | 1·80 | ·56 | 7·66 | 1,262·25 | 99 | 118 |
| Wigan ... | 200,000 | 1,449,188 | 13,018,833 | 8·98 | 1·314 | 65·1 | 105·5 | 2,309 | 7/2 | ·761 | 1·15 | ... | 7·4 | ... | 42 | 67 |
| Wolverh'ton | 135,000 | 1,169,239 | 11,913,122 | 10·198 | 1·08 | 85·25 | 87 | 2,510 | 8/- | ·615 | 1·18 | ·879 | 6·85 | 622·2 | 36·6 | 49 |
| Yarmouth ... | 55,800 | 673,027 | 4,514,871 | 6·7 | 1·256 | 80·91 | 73·7 | 1,687 | 8/6 | ·868 | 1·25 | ·76 | 7 | 375 | 25 | 35 |

### TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belfast ... | 385,492 | 5,946,659 | 58,437,942 | 9·82 | 1·07 | 151 | 128 | 2,539 | 13/- | ·592 | 1·96 | ·43 | 8·75 | 2,256 | 141 | 282 |
| Bexley ... | 16,000 | 262,658 | 2,130,189 | 8·11 | 1·56 | 133 | ... | 2,360 | 18/11 | ·95 | 1·37 | ·62 | 7·5 | ... | 8 | 16 |
| Birkenhead | 130,832 | 1,235,277 | 13,622,361 | 11·02 | 1·077 | 104·12 | 68·64 | 2,540 | 9.4 | ·702 | 1·59 | ·66 | 6·61 | 511·73 | 49·30 | 59 |
| Bournem'uth | 120,000 | 1,882,054 | 15,750 576 | 8·36 | 1·45 | 131 | 95 | 3,214 | 16·- | ·796 | 1·19 | ·87 | 6·80 | 1,140 | 60 | 81 |
| Cardiff ... | 182,729 | 2,614,901 | 28,365,277 | 10·84 | 1·09 | 155 | 98·25 | 4,062 | 14/1 | ·713 | 1·44 | ·736 | 7·5 | 1,120 | 70 | 130 |
| Coventry ... | 135,000 | 994,207 | 7,639,065 | 7·7 | 1·23 | 57 | 68 | 2,516 | 5 9 | ·757 | 1·18 | ·866 | 6·4 | 424 | 35 | 41 |
| Glasgow | 1,150,000 | 23,335,008 | 311,480,086 | 13·348 | ·776 | 270·85 | 105·49 | 5,139 | 17 6 | ·477 | 2·31 | ·44 | 8·13 | 8,484·59 | 606·04 | 843 |
| Huddersfield | 160,000 | (a) 2,383,858 | 21,595,569 | 9·09 | 1·18 | 144 | 120 | 3,675 | 13/4 | ·728 | 1·39 | ·70 | 7·48 | 868·32 | 54·27 | 86 |
| Hull ... | 287,032 | 4,040,739 | 42,997,226 | 10·64 | ·877 | 149·80 | 127·10 | 5,141 | 10/7 | ·631 | 2·75 | ... | 9 | 1,393·6 | 87·10 | 160 |
| Leeds ... | 500,000 | 8,795,463 | 89,668,185 | 10·2 | 1·088 | 179 | 113·35 | 3,594 | 16/3 | (b) ·937 | 1·95 | ·539 | 7·48 | 3,190 | 213 | 232 |
| Leicester ... | 229,296 | 3,663,215 | 32,807,795 | 8·983 | ·981 | 143 | 95 | 3,648 | 11/9 | ·693 | 2·18 | ·984 | 8 | 1,926 | 107 | 140 |
| London ... | ... | H 1,680,786 | 17,347,746 | 10·32 | ·84 | ... | 83 | 2,646 | ... | 1·019 | ... | ... | 6·15 | 742·5 | 55 | 96 |
| | | E 48,777,026 | 516,092,489 | 10·58 | 1·04 | ... | 113 | 8,732 | ... | ·627 | ... | ... | 8·44 | 15,786·8 | 1,179 | 1,584 |
| Newcastle ... | 300,000 | 4,780,662 | 52,204,974 | 10·92 | 1·082 | 174 | ... | 3,738 | 15/2 | ·593 | 1·53 | ·633 | 7 | ... | ... | 192 |
| Northampt'n | 90,793 | 640,158 | 6,727,190 | 10·51 | ·97 | 76·53 | ... | 2,974 | 6 - | ·58 | 1·34 | ·7 | 6·91 | ... | ... | 26 |
| Portsmouth | 241,256 | 2,155,508 | 24,520,647 | 11·37 | 1·052 | 101·63 | 84 | 3,505 | 9/- | ·511 | 1·66 | ·62 | 7 | 1,072 | 72 | 100 |
| Preston ... | 120,000 | 970,719 | 9,567,366 | 9·85 | 1·06 | 79·73 | 132 | 2,498 | 7 2 | ·603 | 1·01 | ·95 | 7·36 | ... | ... | 33 |
| Reading ... | 76,000 | 915,180 | 8,251,274 | 9·01 | ·97 | 108 | 97 | 2,505 | 8 8 | ·57 | 1·59 | ·68 | 7 | 352 | 26 | 36 |
| Sheffield | 466,408 | 8,071,188 | 96,350,242 | 11·935 | ·803 | 206·535 | 103·32 | 4,606 | 15 5 | ·517 | 2·62 | ·386 | 7·372 | 3,103·27 | 214·019 | 273 |
| Wallington | 68,000 | 2,303,913 | 25,858,412 | 11·08 | 1·40 | 350 | 90 | 4,706 | 43/11 | ·94 | 1·112 | ·88 | 7·86 | 803 | 70 | 89 |

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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# TRAMWAY AND OMNIBUS SHARE LIST.

## Specially Compiled for "The Tramway and Railway World."

| Amount Ranking for Dividend. | Shares. | Name. | Div'd. Prev. Half-year. | Div'd. Last Half-year. | Quotations, December 4 | Movement Since Nov. 6. Rise. | Fall. | Latest Business Done. Price. | Date. | Yield on Buying Price. £ s. d. | Dividend Due. (Final in Italics.) | Quotations, Jan., 1908, to Dec. 4, 1913. Highest | Lowest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 640,000 | 5 | Anglo-Argentine Tramways 5½% Cum. 1st Pref. | 2/9 | 2/9 | 4 9/16—4 11/16 | ... | — 1/16 | 92/9 | Dec. 4 | 5 14 3 | Jan., Dec. | 5 15/16 | 4 1/2 |
| 500,000 | 5 | Do. do. 5½% Cum. 2nd Pref. | 2/9 | 2/9 | 4 1/16—4 1/16 | ... | ... | 83/9 | Dec. 4 | 6 4 0 | June, *Dec.* | 5 1/2 | 4 1/16 |
| 1,500,000£ | ... | Do. do. 5% Deb. Stock Red. | 5% | 5% | 96—108xd | ... | ... | 97/8 | Dec 4 | 5 2 0 | June, Dec. | 105 1/2 | 95 1/2 |
| 325,532£ | Stk. | Auckland Elec. Trys. Co. 5% Mort. Deb. ... | 5% | 5% | 101½—103½ | + 1½ | ... | 103 | Nov. 27 | 4 18 9 | Jan.. July. | 107 | 99½ |
| 75,000 | 1 | Bath Electric Tramways 5% Cum. Pref. ... | 6d. | 6d. | 21/32—30/32 | ... | ... | 14/6 | Dec. 31/12 | 6 8 0 | *Jan. & July* | 1 1/16 | 7/16 |
| 334,696£ | Stk. | Birmingham Dist. Pow. & Tract. 4½% 1st Deb.... | 4½% | 4½% | 86—88 | ... | ... | 86 | Dec. 1 | 5 2 3 | Jan., July. | 96 | 77 |
| 15,000 | 10 | Blackpool and Fleetwood Tramways ... ... | 9/- | 4/- | 13¾ -14 | + ¼ | ... | 13 13/16 | Nov. 12 | 4 13 0 | Feb., Aug. | 14½ | 12 |
| 60,000 | 10 | Bombay Elec. Supply & Trys. Co. 6% Cum. Pref. | 6/- | 6/- | 10¾—11½ | ... | ... | 10¾ | Dec. 4 | 5 6 9 | Feb., Aug. | 12¼ | 7⅜ |
| 1,003,614 | $100 | Brazil Traction... ... ... ... ... ... | 6 | 6 | 88½—90½ | + 3 | ... | 89¾ | Dec. 4 | 6 16 0 | Fb.My.Ag.Nv. | 105½ | 83½ |
| 75,000 | 5 | Brisbane Elec. Tramways Investment Co, Ord. | 4/- | 4/- | 7½—7¾ | ... | ... | 7 17/32 | Dec. 2 | 5 6 0 | *May*, Oct. | 9½ | 3 9/16 |
| 75,000 | 5 | Do. do. do. 5% Cum. Pref. | 2/6 | 2/6 | 4⅜—5⅜ | ... | ... | 5 | Dec. 3 | 4 13 0 | *May*, Nov. | 5⅜ | 4⅜ |
| 50,000 | 10 | Bristol Tramways and Carriage Co. ... ... | 4 | 4 | 5⅜—5¾ | ... | ... | 5⅜ | Oct. 29 | 6 19 3 | *Feb.*, Aug. | 14½ | 5 |
| 50,000 | 10 | Do. do. do. 4% Cum. Pref. | 4 | 4 | 6¼—6¾ | ... | — ⅛ | 6⅝ | Nov. 21 | 5 10 6 | Jan., July. | 9¼ | 6¾ |
| 800,000£ | Stk. | British Columbia Electric Railway Def. Ord. .. | 8% | 8% | 115—120 | ... | — 2 | 116½ | Dec. 3 | 6 13 6 | May, Nov. | 156 | 114 |
| 800,000£ | Stk | Do. do. Pref. Ord. ... .. | 6% | 6% | 103—107 | ... | — 2 | 105½ | Dec. 4 | 5 14 3 | Feb., Aug. | 132⅛ | 103 |
| 800,000£ | Stk | Do. do. 5% Cum. Perp. Pref. | 5% | 5% | 102—105 | + 3 | ... | 103¾ | Dec. 4 | 4 17 0 | Jan., July. | 114 | 98½ |
| 1,070,097£ | Stk. | British Electric Traction Prefd. Ord. ... ... | ... | ... | 10—12 | ... | — 1 | 11 | Dec. 4 | ... | Apr., *Oct.* | 16 | 8 |
| 403,503£ | Stk. | Do. do. 6% Cum. Pref. .. | 6% | 6% | 87—90 | + 1 | ... | 88¼ | Dec. 3 | 6 16 6 | Feb., *Aug.* | 95¼ | 73 |
| 1,464,245£ | Stk. | Do. do. 5% Perp. Deb. ... | 5% | 5% | 91—94 | + 2 | ... | 92⅝ | Dec. 3 | 5 7 6 | April, Oct. | 101 | 82⅛ |
| 439,796£ | Stk. | Do. do. 4½% 2nd Deb. Red. ... | 4½% | 4½% | 77—80 | + 2 | ... | 77 | Nov. 3 | 5 12 6 | May, Nov. | 84 | 58 |
| 246,625£ | Stk. | Buenos Aires Port & City Trys. 6% 1st Mt. Deb. | 6% | 6% | 87—91 | ... | ... | 90¾ | Aug. 20 | 6 12 0 | Feb., Aug. | 103 | 61 |
| 623,270£ | Stk. | Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb. | 5% | 5% | 98⅜—100½ | ... | ... | 100 | Dec. 2 | 5 0 0 | Mar., Sept. | 103 | 89 |
| 137,610 | 5 | Calcutta Tramways Ord. ... ... ... ... | 5/- | 2/6 | 5⅞—6⅜ | ... | — ⅛ | 6 | Dec. 4 | 5 17 9 | *Apr.*, Oct. | 7¼ | 4 |
| 47,295 | 5 | Do. 5% Cum. Pref. ... ... | 2/6 | 2/6 | 4 1/16—5 1/16 | ... | — 1/16 | 5 1/16 | Nov. 28 | 4 16 6 | Jan., July | 5⅜ | 4⅜ |
| 491,222 | 1 | Cape Electric Tramways ... ... ... ... | 1/- | for '12 | 31/32—32/32 | ... | — 1/16 | 14/3 | Nov. 3 | 6 19 3 | Feb., *Nov.* | 1 1/16 | 1/8 |
| 15,000 | 10 | Carthagena and Herrerias Steam Tramways ... | 4/- | May, '13 | 3—3¾ | ... | ... | 75/- | May 6 | 5 6 9 | April. | 7 | 3 |
| 248,000 | 5 | City of Buenos Ayres Tramways (1904) ... | 2/6 | 2/6 | 5¼—5⅜ | + ⅛ | ... | 5 1/32 | Dec. 2 | 4 15 3 | Fe My.Au No | 6 | 5⅛ |
| 120,000£ | Stk. | Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ... | 5% | 5% | 88—92 | ... | ... | 96 | Jan. 31 | 5 8 9 | May, Nov. | 101 | 87 |
| 11,500 | 10 | Cork Electric Tramways and Lighting Co. ... | ... | 6/- ann. | 4¼—4⅜ | ... | ... | 4 15/16 | Dec. 23 | 6 6 6 | *Mar.* | 10 | 4¼ |
| 12,327 | 10 | Do. do. do. 5% Cum Pref. | 5/- | 5/- | 7¼—7⅜ | ... | ... | 8 1/16 | June 12 | 6 9 0 | Jan.. July | 10¾ | 7⅛ |
| 3,000 | 10 | Dublin and Lucan Elec. Railway 5% Cum. Pref. | 5/- | 5/- | 8¼—8¾ | ... | ... | 9 | Aug. 25/10 | 5 14 3 | Sep.15, Mar.15 | 9¼ | 6 |
| 60,000 | 10 | Dublin United Tramways Co. (1896), Ltd., Ord. | 6/- | 6/- | 10—10⅛ | ... | — ⅛ | 10¾ | Nov. 6 | 5 14 3 | Feb., Aug. | 14 | 11 |
| 60,000 | 10 | Do. do. do. 6% Cum. Pref. | 6/- | 6/- | 11¾—12¼ | ... | ... | 12 | Nov. 3 | 4 18 0 | *Feb.*, Aug. | 14 | 11½ |
| 13,500 | 10 | Gateshead & District Trys. Co. Ord. ... ... | 9/- | 5/- | 9—9½ | ... | ... | 9 5/16 | Dec. 1 | 7 7 6 | *Mar.*, Sept. | 9½ | 7⅞ |
| 268,235 | 10/- | Hastings and District Elec. Trys Ord. ... ... | ... | ... | 31/32—32/32 | ... | ... | 1/9 | Jan. 5/12 | ... | ... | 1 1/16 | 15/16 |
| 80,000 | 1 | Do. do. 6% Cum. Pref. ... | 6% | 6% | 15/16—1 1/16 | ... | ... | 12/6 | June 6 | 8 14 6 | ... | 1 1/8 | 31/32 |
| 125,000£ | Stk. | Do. do. 4½% Deb. Stk. Red. | 4½ | 4½ | 66—71 | ... | ... | 68⅛ | Aug. 19 | 6 6 9 | April, Oct. | 100 | 68 |
| $9,634,000 | $1,000 | Havana Elec. Rly. Co. Con. Mort. 5% ... ... | 5% | 5% | 94½—98⅛ | ... | ... | 98⅜ | Oct. 15 | 5 4 3 | Feb., Aug. | 105 | 80 |
| 195,000£ | 100 | Hong Kong Tramways Co. 5% Mt. Deb. ... | 5% | 5% | 84½—89½xd | ... | ... | 89½ | Nov. 3 | 5 12 0 | May, Nov. | 92 | 75½ |
| 20,000 | 10 | Imperial Tramways Ord. ... ... ... ... | Nil | 4% year | 3¾—4¼ | ... | ... | 9¾ | Oct. 29/09 | 9 8 6 | Feb., Aug. | 9¾ | 2¼ |
| 20,000 | 10 | Do. 6% Cum. Pref. ... ... | Nil | 6% year | 6¼—6¾ | ... | ... | 6 9/16 | Ju. 28/09 | 8 18 0 | Jan.. July. | 9¼ | 2¾ |
| 30,000 | 5 | Isle of Thanet Elec. Try. & Ltg. Co. 5% Cum. Pref. | 2/6 | Dec. '12 | 2⅛—2⅜ | + 1/16 | ... | 46/3 | Nov. 30/12 | 5 14 3 | *Mar.*, Sept. | 3 | ¾ |
| 250,000 | 1 | Kalgoorlie Electric Tramways ... ... ... | ... | ... | 0—1/16 | ... | ... | 1/- | Jan. 15/12 | ... | *May* | 3/16 | 0 |
| 170,000 | 1 | La Plata Elec. Trys. Co. 6% Cum. Pref. ... | 0/4·65 | 0/4·80 | 7/8—1 | ... | ... | 17/- | Oct. 14 | 6 0 0 | *April.* Oct. | 1 1/16 | 1/4 |
| 30,800 | 10 | Lanarkshire Tramways ... ... ... ... | 6/- | 6/- | 9¾—10¼ | ... | ... | 10½ | Nov. 24 | 5 17 6 | Feb., Aug. | 10 1/16 | 9⅜ |
| 250,000£ | Stk. | Lancashire United Trys. 5% Prior Lien Deb.... | 5% | 5% | 77—81 | ... | ... | 78¾ | Oct. 11 | 6 5 0 | Jan., July. | 95 | 76 |
| 634,026 | 1 | Lisbon Electric Tramways Ord. ... ... ... | 7/16d. | 7/16d. | 1⅛—1⅜ | + ⅛ | ... | 22/3 | Aug. 25 | 4 7 3 | *July.* | 1 3/16 | ⅛ |
| 425,553 | 1 | Do. do. 6% Cum. Pref ... | 7/16d. | 7/16d. | 1/16—1 1/16 | ... | ... | 22/6 | Feb. 15 | 5 1 3 | Jan., July. | 1¼ | 1/16 |
| 1,666,673 | 1 | London and Suburban Traction Ord. ... ... | 0 1/16—0 1/16 | ... | ... | 4/9 | Dec. 4 | ... | ... | 33/32 | 1/16 |
| 1,316,268 | 1 | Do. do. do. 5% Cum. Pref. | ... | 5 | ⅜—⅝ | ... | — 1/32 | 11/6 | Dec. 4 | 8 0 0 | Feb., Aug. | 32/32 | 1/16 |
| 1,000,000£ | Stk. | London General Omnibus 4½% 1st Deb. ... ... | ... | 4½ | 95—97 | ... | — 1 | 97 | Dec. 4 | 4 14 0 | Jan., July. | 98½ | 92½ |
| 1,000,000£ | Stk. | Do. do. 5% Cum. Income ... | 5 | 5 | 85—87 | ... | — 2 | 86½ | Nov. 26 | 5 15 9 | Feb., Aug. | 94 | 85⅜ |
| 1,649,930£ | Stk. | London United Tramways 4% 1st Deb. Stk. ... | 4 | 4 | 58—62 | ... | — 2 | 59 | Nov. 26 | 6 12 3 | *Jan.*, July. | 82 | 54⅜ |
| 63,430£ | Stk. | Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ... | 5% | 5% | 101—103 | ... | ... | 101½ | Oct. 16 | 4 17 3 | Jan., July. | 105 | 86 |
| 20,000 | 5 | Do. Do. Do. 6% Cum. Pref. ... | ... | ... | 4⅞—5¼ | + ⅛ | ... | 5⅛ | Dec. 3 | 5 14 3 | ... | 5 1/16 | 87/6 |
| 300,000£ | 100 | Manaos Trys. & Ltg. Co. 5% 1st Debs. ... ... | 5% | 5% | 85—87 | ... | — 2 | 87½ | Aug. 1 | 5 17 9 | Jan., July. | 97 | 86 |
| $4.785,000 | $1.000 | Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds. | 5% | 5% | 96½—98½ | ... | ... | 96¾ | Oct. 27 | 5 4 6 | Mar., Sept. | 104⅜ | 84 |
| 60,000 | 1 | Mansfield & District Trys. Ltd. 6% Cum. Pref. | 7/16d. | 7/16d. | 7/8—1 | ... | — 1/32 | 18/6 | Sept. 24 | 6 0 0 | Mar., Sept. | 1 1/16 | ¾ |
| $20.000,000 | $100 | Mexico Tramways Common Stock ... ... | $3½ | $3½ | 78—81 | + 3 | ... | 80 | Dec. 4 | 8 17 3 | Fb.My.Au.No | 151½ | 65 |
| $3,840,000 | ... | Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds | 5% | 5% | 91—93 | ... | ... | 91 | Nov. 6 | 5 10 0 | May, Nov. | 101½ | 89½ |
| 600,000£ | 100 | Montreal Street Rly. 4½% Ster. Debs. ... ... | 4½% | 4½% | 99—101 | ... | — 3 | 98½ | Nov. 25 | 4 10 0 | Fe.My.Au.No. | 107 | 97 |
| 150,000 | 1 | National Steam Car ... ... ... ... ... | 2/- | year | 1 3/32—1 7/32 | ... | — 1/32 | 22/6 | Dec. 4 | 8 4 3 | Dec. | 39/9 | 18/- |
| 5,000 | 10 | Oldham, Ashton, and Hyde Elec. Tramways Ord. | 7/- | 5/- | 5⅜—6 | ... | — ⅛ | 7 | Apr. 2 | 10 0 0 | Mar., Aug. | 9⅜ | 6⅛ |
| 5,000 | 10 | Do. do. do. 5% Cum. Pref. | 5% | 5% | 6⅜—6⅝ | + ¼ | ... | 6 17/32 | July 8/12 | 7 18 0 | Feb., Aug. | 8⅜ | 6¼ |
| 77,893 | 5 | Para Elec. Rly. and Ltg. Co., Ord. ... ... | 5/- | 5/- | 5⅜—6¼ | + ¾ | ... | 5 13/32 | Nov. 25 | 8 0 0 | May, Nov. | 8 | 5 |
| 100,000 | 1 | Perth (W.A.) Electric Tramways Ord. ... ... | 6d. | 7/16d. | 1 1/16—1 1/16 | ... | — 1/16 | 25/6 | Nov. 8/12 | 4 7 9 | *Sept.*, Nov. | 26/10½ | ¾ |
| 245,000 | 1 | Potteries Electric Traction Ord. ... ... ... | 3½ | for '11 | 6/16—7/16 | ... | ... | 8/3 | Nov. 3 | 8 0 0 | April. | ¾ | ⅛ |
| 245,000 | 1 | Do. do. 5% Cum. Pref. ... | 6d. | 6d. | 15/16—1 1/16 | ... | ... | 12/6 | July 2 | 7 5 6 | *Feb.*, Aug. | ¾ | 1/16 |
| 124,560 | 1 | Provincial Tramways Ord. ... ... ... ... | 10d. | 8d. | 29/32—30/32 | + ⅛ | ... | 18/- | Nov. 11 | 9 4 0 | May. *Nov.* | 1 1/16 | 13/- |
| 10,000 | 10 | Do. do. 6% Cum. Pref. ... ... | 6/- | 6/- | 9⅛—9⅜ | ... | ... | 9¼ | Oct. 30 | 6 8 0 | June, *Dec.* | 11 | 9 |
| 50,000 | 5 | Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref. | 3/- | 3/- | 5⅛—5⅜ | + ⅛ | ... | 5 1/16 | July 17 | 5 6 9 | June, Dec. | 6 | 5 |
| 32,000 | 10 | Shanghai Elec. Construction Co, ... ... ... | 10/- | year | 10½—11½ | ... | ... | 11 | Nov. 6 | 4 7 0 | May. | 11½ | 6 |
| 330,400£ | Stk. | Singapore Elec. Trys. Ltd., 5% Debs. Red. ... | 5% | 5% | 86—90 | ... | ... | 87 | July 29 | 5 11 3 | Mar., Sept. | 89 | 61 |
| 169,570 | 1 | S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref. | 1/2⅜ | May, '12 | ⅜—¾ | ... | ... | 15/9 | May 16,'12 | 8 0 0 | Feb., Aug. | 1⅛ | ⅜ |
| 91,720£ | Stk. | Southern Elec. Trys. of B.A., 1st Mt. Deb. ... | 5% | 5% | 93—95 | ... | ... | 94½ | Aug. 7 | 5 4 9 | Feb., Aug. | 100 | 90 |
| 471,500£ | 100 | Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ... | 4½% | 4½% | 97—99 | ... | ... | 98½ | Nov. 26 | 4 12 9 | Feb., Aug. | 104 | 97 |
| 80,000 | 5 | United Elec. Tramways of Monte Video, Ord.... | 3/- | 4/- | 4⅞—5¼ | ... | ... | 4⅞ | Nov. 6 | 6 13 6 | *June*, Dec. | 6¼ | 4⅜ |
| 90,000 | 5 | Do. do. do. 6% Cum. Pref. | 3/- | 3/- | 4⅞—5¼ | ... | — ⅛ | 5⅛ | Oct. 28 | 5 14 3 | June, Dec. | 6⅜ | 4 1/16 |
| 500,000£ | Stk. | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs. | 4½% | 4½% | 95—97 | ... | — 3/8 | 100 | Oct 31 | 4 13 9 | Apr., Oct. | 109⅜ | 94½ |
| 40,977 | 5 | Yorkshire (West Riding) Elec. Trys. Ord. ... | ... | ... | ⅛—¼ | ... | ... | 8/- | Oct. 31 | ... | *Mar.* | 1⅛ | ⅛ |
| 46,261 | 5 | Do. do. do. 6% Cum. Pref. | 1/6 | 1/6 | 3⅜—4 | ... | ... | 78/- | Nov. 25 | 3 15 0 | *Mar.* | 4 | 1½ |

## ELECTRIC RAILWAY SHARES.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,854,720£ | Stk. | Central London Ord. Stock (4% Guar.) ... ... | ... | ... | 79—81 | + 1 | ... | 80½ | Dec. 3 | 4 18 9 | *Feb.*, Aug. | 89½ | 59⅝ |
| 572,640£ | Stk. | Do 4% Guar. Pref. Stock ... ... | 4 | 4 | 81—83 | .. | ... | 82½ | Nov. 6 | 4 16 6 | Feb., Aug. | 92 | 80 |
| 572,640£ | Stk. | Do. Deferred Stock (4% Guar.) ... | ... | ... | 77—79 | ... | ... | 78⅜ | Nov. 26 | 4 18 9 | Feb., Aug. | 91⅜ | 42 |
| 50,000 | 10 | Liverpool Overhead Ord. ... ... ... ... | 2/- | 2/6 | 4 1/16—4 7/16 | + 1/16 | ... | 87/6 | Dec. 3 | 5 7 6 | *Feb.*, Aug. | 4⅜ | ⅜ |
| 1,412,263£ | Stk. | Mersey Cons. Ord. Stock ... ... ... ... | Nil | Nil | 5—5½ | ... | ... | 4½ | Dec. 4 | ... | *Feb.*, Aug. | 8 | 1 |
| 5,732,062£ | Stk. | Metropolitan Cons. ... ... ... ... ... | 1¾ | 1¾ | 41⅞—42¼ | + 1½ | ... | 42 | Dec. 4 | 3 10 3 | *Feb.*, Aug. | 75⅛ | 34 |
| 2,640,914£ | Stk. | Do. Surplus Lands Stock ... ... | 2½ | 2½ | 58—60 | ... | ... | 59½ | Dec. 4 | 4 10 3 | *Feb.*, Aug. | 72 | 58 |
| 3,235,000£ | Stk. | Metropolitan District Ord. ... ... ... ... | Nil | Nil | 30—30½ | + 1½ | ... | 30⅜ | Dec. 4 | ... | *Feb.*, Aug. | 51½ | 9½ |
| 500,000 | 10 | Underground Electric Railways Co. of London ... | ... | ... | 3½—3⅝ | .. | ... | 71/3 | Dec. 4 | ... | ... | 5 1/16 | 1⅜ |
| 1,730,000£ | ... | Do. 4½% Bonds of 1933 ... ... ... | 4½% | 4½% | 99—101 | ... | ... | 100 | Dec. 3 | 4 9 0 | Jan., July | 102 | 73 |
| 1,192,707£ | ... | Do. 6% 1st Income Debs. ... ... | 6% | 6% | 111—113 | + 1 | ... | 113½ | Dec. 4 | 5 7 3 | Mar., Sept. | 117¼ | 108 |
| 6,120,750£ | Stk. | Do. 6% Income Bonds ... ... | 60/- | 60/- | 89—90 | + 1 | ... | 89½ | Dec. 4 | 6 11 3 | Mar., Sept. | 97½ | 18 |
| 1,150,477 | 1/- | Do. "A" Ord. ... ... ... ... | ... | ... | 1/16—⅛ | ... | — 1/32 | 8/9 | Dec. 4 | ... | ... | ⅛ | 1/32 |



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## INTERNATIONAL TRAMWAY CONGRESS TO BE HELD AT BUDAPEST.

The Executive Committee of the "Union Internationale de Tramways et de Chemins de fer D'Interet Local" have accepted the invitation of the Hungarian Government and the City of Budapest to hold the eighteenth biennial International Tramway Congress at Budapest. The date, as announced in a previous issue, has been fixed for August 31, 1914. The list of questions selected for discussion is as follows:

1. The policy of the distribution of population in towns with regard to means of transport.
   (*a*) The influence of new methods of transport upon the development and extension of great cities. The influence of modern transportation methods upon social customs.
   (*b*) Tariffs of tramways and city and suburban railways:
   1. Bases and methods of investigation. Influence upon traffic. 2. Transfer tickets at reduced prices. Influence upon results of working. 3. Season tickets and various methods of calculating their prices.

Reporters: MM. Duval-Arnould, Membre du Conseil Municipal de la Ville de Paris, and Dr. Kuhles, Membre du Conseil Municipal de la Ville de Munich.

2. Corrugation of rails.

Reporters: MM. Busse, Ingénieur en chef de la Grande Compagnie des Tramways de Berlin, and Resal, Directeur de la Compagnie Française des Tramways électriques et Omnibus de Bordeaux.

3. Rails and tyres.
   (*a*) Investigation into the best shape for rails and tyres, in order to obtain the lowest rolling coefficient and a minimum wear of tyres on curves. Sections of rails with and without grooves; sections of tyres; position of tyres on the rails on straight and on curves; influence of wheel base on curves.
   (*b*) Use of special rails for curves (manganese rails; rails with movable lip adjustable or otherwise).

Reporters: MM. Bacqueyrisse, Ingénieur en chef des Tramways de la Compagnie Générale des Omnibus de Paris, and Minorini, Ingénieur, Directeur des Tramways municipaux de Milan.

4. Roller or ball bearings. Results obtained on motor cars, and on trailers. Resulting saving of current secured.

Reporters: MM. Largiader, Directeur des Tramways municipaux de Zurich; Schoerling, Ingénieur en chef des Tramways de Hanovre; and Tobias, Conseiller technique, Directeur des Ateliers des Tramways électriques de Budapest.

5. Motormen, conductors, and inspectors. (*a*) Methods of instructing them. (*b*) Ticket checking. Methods of delivery of tickets to conductors, accounting for tickets sold, and collection of money.

Reporters: MM. Noirfalise, Directeur Général de la Société Anonyme des Tramways Liégeois, Liége, and Karl Roethy, Inspecteur en chef des Tramways de Budapest.

6. Special appliances for wagons of narrow gauge lines to facilitate the exchange of goods with standard railways. Results obtained from the point of view of time taken and the cost of transhipment.

Reporter: M. Sapin, Administrateur-Directeur de la Compagnie Centrale de Chemins de fer et Tramways électriques, à Paris, Administrateur des Tramways d'Ekaterinoslaw, Bruxelles.

7. Method of working on a length of line common to different concessions. Division of receipts and expenses.

Reporter: M. Fr. Carnevali, Ingénieuren chef de la Société des Tramways de Turin.

8. Light railway locomotives.
   (*a*) Improvements made during recent years.
   (*b*) Is it of advantage (1) To conceal the wheels and the motor mechanism by a metallic cover? (2) To have a platform at each end of the locomotive?

Reporter: M. Hamelink, ancien Directeur de la Compagnie des Tramways Neerlandais, Utrecht.

   (*c*) Employment of superheaters.

Reporter: M. de Soignie, Directeur de la Société Anonyme Mosane pour l'exploitation des Chemins de fer Vicinaux, Andenne (province de Namur).

9. Subterranean feeder cables.
   (*a*) Technical conditions which must be met by armoured cables. (*b*) Use of aluminium as a conductor. (*c*) Probable life of subterranean cables. Statistics.

Reporter: M. Sekutowicz, Directeur des Exploitations de l'Omnium Lyonnais de Chemins de fer et de Tramways, Paris.

10. Three wire distribution for a tramway system. Distribution by higher tension in the suburbs than in the city. Special arrangements of rolling stock, of the generating machinery, and distribution system in order to meet these problems.

Reporter: M. Sieber, Directeur des Tramways de Nuremberg-Furth Nuremberg.

11. Advantages and disadvantages of various systems of transforming high-tension or alternating current to continuous current; motor-generators, transformers, and rotary transformers, etc.

Reporters: MM. Dalrymple, general manager, Glasgow Corporation Tramways, and Sarrat, Ingénieur en chef à la maison E. L. J. Empain, Bruxelles.

12. (*a*) Facilities given to the public for entering carriages; signs at stopping points; distribution of numbers; covered shelters; movable barriers and corridors and refuges; raised platforms; the advantage at times of heavy traffic of supplementary cars, either motor or trail cars.
   (*b*) Means of communicating to the public the destination and route of cars, both inside and outside the cars.
   (*c*) Commercial publicity employed for the purpose of increasing the receipts of tramways and light railways.

Reporter: M. Rodolphe de Weck, Ingénieur des Arts et Manufactures, Directeur de la Société des Tramways de Fribourg et du Chemin de fer Fribourg-Morat-Anet, Président de l'Union de Chemins de fer secondaires suisses, Fribourg (Suisse).

## PERSONAL.

**Mr. G. J. Hollyer** has been appointed station superintendent at Walthamstow Council electricity works.

**Mr. George Balfour,** of Messrs. Balfour, Beatty, and Company, has been appointed a director of the United Electric Tramways of Monte Video.

**Mr. G. W. Stevenson** has left England for Pernambuco, Brazil, to take up a position with Messrs. J. G. White and Company, on the Pernambuco tramways.

**Mr. H. Hughes,** having being appointed chief clerk to Ashton-under-Lyne Corporation Tramways, has resigned his appointment on Walsall tramway staff.

**Mr. C. B. Cripps** has resigned his position with the London County Council tramways department to take an appointment under the Aldershot District Council.

**Mr. L. B. Hogarth,** borough electrical engineer at Morecambe, has been selected for appointment to a similar position at Whitehaven, at a yearly salary of £250. There were 180 applicants.

**Mr. Percy Hodges,** of the Blackpool Corporation electricity works, has received an appointment at Valparaiso. The staff have presented him with a gold watch, a travelling trunk, and a fountain pen.

**Mr. T. E. Boothby,** of the Oldham Corporation electricity department, has been appointed shift engineer at the works of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways and Electricity Board.

**Mr. Allan B. Field,** chief designer of turbo-electric machinery to the Westinghouse Electric Company, Pittsburg, has been appointed professor of mechanical engineering at the Manchester School of Technology.

**Mr. P. J. Boucher,** for three years traction lamp expert to Siemens Brothers Dynamo Works, Limited, has been appointed to a similar position with the Edison and Swan United Electric Light Company, London.

**Mr. S. C. Marengo,** sub-manager of the Buenos Ayres and Pacfic Railway Company, has, resigned that position, having been appointed general manager of the Central of Buenos Ayres Railway Company and the Lacroze Tramways Company.

**Mr. W. H. Taylor** has resigned the position of assistant electrical engineer at Walthamstow Council electricity works, to accept an appointment as chief station superintendent at the new Government power-station at Perth, Western Australia.

**Councillor J. H. Hargreaves** has been elected Mayor of Hull. Owing to indifferent health, Alderman Robson resigned the chairmanship of the Tramways Committee, and Councillor Hargreaves, the deputy-chairman, was appointed in his place.

**Mr. F. O. C. Nash,** who has been in charge of the tramway extensions on the west of Newcastle-on-Tyne, has received an appointment under the Town Planning Act with the Birmingham Corporation. Mr. Nash is an officer in the Territorial Force.

**Inspector J. Campbell,** Manchester Corporation Tramways, has been presented with a silver coffee service by the employees of the Oldham Road branch on the occasion of his retirement. He has also received a clock from passengers on the Rochdale Road section.

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**Mr. R. S. Tresilian,** secretary of the Dublin United Tramways, has returned to Dublin after a month's tour, in the course of which he visited Brussels, Paris Berlin, Vienna, Budapest, Athens, Smyrna, and Constantinople. He devoted much attention to tramway systems.

**Mr. J. Brierley,** who has been appointed traffic manager to Oldham Corporation Tramways, started as a car cleaner on the steam tramways, 17½ years ago. After the electrification he became a motorman, and subsequently he went into the repair shop. He has since served as an inspector and chief inspector.

**Alderman A. Martin,** chairman of Southend Light Railways Committee, presided at the first of the annual dinners of the employees, and, responding to the toast of his health, said more depended upon the staff who had the handling of the tramway undertaking than upon the members of the committee who controlled it.

**Alderman R. A. Smithson** has been appointed chairman of Leeds Tramways and Electricity Committee. He thus resumes a position he formerly held for more than 10 years. During his chairmanship the electrification of the Leeds tramways was completed, and the department became one of the most prosperous in the country.

**Mr. J. J. McGregor,** assistant engineer at the Deptford generating station of the London Electric Supply Corporation, has been appointed charge shift engineer at the London County Council's Greenwich generating station in succession to Mr. W. W. Warren, resigned. The salary is £250 a year, rising by annual increments of £10 to £300. There were 140 applications.

**Mr. Charles Vernier,** the new chairman of the Newcastle-on-Tyne local section of the Institution of Electrical Engineers, is 36 years of age. Before taking up his present position with the Newcastle-on-Tyne Electric Supply Company he was from June, 1899, to the end of 1900 an assistant engineer of the Cork Electrical Tramways and Lighting Company. He received this appointment from Mr. Charles H. Merz, who was then chief engineer to the company.

**Mr. Charles Furness,** general manager, Blackpool Corporation Tramways, and borough electrical engineer, has received from the Tramways Committee an increase of £200 in his salary of £700 per annum. Improvements introduced by Mr. Furness, including the open touring cars on the circular route, helped to increase the receipts to £74,166, as compared with £42,572 in 1904. For the 8½ months of the present year the receipts have reached £73,018, and it is estimated that by the end of the year the total will be £85,000. The profit in 1904 was £1,032 and last year £18,331, while for the present year the estimate is £25,000.

**Mr. J. Dalrymple,** general manager, Glasgow Corporation Tramways, was referred to by the chairman of the Tramways Committee in the remarks which he made at the luncheon on the occasion of the annual inspection of the various departments. Ex-Bailie Kirkland observed that during the year they had increased the wages of the employees in every section with the exception of the general manager. The maximum wage of motormen and conductors had been raised from 33s. to 34s. per week, and next year it would be further increased to 35s. per week. The cars, the chairman added, were carrying 337 millions of passengers per annum.

**Mr. Walter T. Young,** who for two years has been traffic superintendent, Oldham Corporation Tramways, has been appointed to a similar position under the West Ham Corporation. Before going to Oldham he served under the Aberdeen Corporation for 14 years, and for four years was traffic superintendent. On December 5 Mr. Young was presented by the Oldham staff and employees with a gold watch chain, and a gold pendant for Mrs. Young. In making the presentation, Mr. Dugdale, the manager, stated that Mr. Young had risen from the bottom of the ladder. In reply, Mr. Young said he had tried to follow the motto of the Tramwaymen's Brotherhood.

**Motorman Gamble,** of the Birmingham tramways, was presented with a guinea at a meeting of the Tramways Committee by the Lord Mayor, who complimented him upon a plucky act. A little girl ran in front of his car, whereupon Gamble applied the brakes, but realising that it was not possible to stop the car in time he jumped off, and dragged the child away just in time to prevent an accident. Gamble himself ran considerable risk, and he received a slight injury. The matter was reported to the trustees of the Carnegie Hero Fund, but they are reluctant to intervene in the case of a municipal employee, believing that the municipality should make the acknowledgment of such acts of courageous conduct.

**Mr. C. W. Shepherd,** general manager, Edinburgh Tramways Company, at one of the three annual concerts on November 21 in aid of the Tramways Employees' Widows' and Orphans' Fund, was congratulated by Mr. B. Hall Blyth, the chairman of the company, on being present after the serious illness which he had gone through. Sir Robert Maule, one of the directors, who presided, at one of the other concerts, made a similar observation. These concerts, which were originated by Mr. Shepherd, have contributed £2,450 to the funds, of which sum £1,300 is invested. The employees each first contributed 4s. 4d. and now 6s. 6d. annually, and in 10 years their contributions have totalled £1,490.

**Mr. R. H. Harvey,** engineer and manager to the Ascuncion Tramways of the Paraguay Central Railway Company, was referred to at a recent meeting of the shareholders in London. The chairman (Mr. V. V. Branford) stated that the directors were fortunate in obtaining the services of a very able and experienced engineer and tramway manager, under whose organisation the electrification of the Ascuncion tramway had proceeded satisfactorily, and would be completed within a few weeks probably, and the installation of the light and power plant before the end of the year. A separate company, the Ascuncion Tramway, Light, and Power Company, had been organised and would work in collaboration with the railway company.

**Mr. F. Eggington,** who for some years has been the chief assistant in the West Ham tramways department, has resigned that position in order to take a position under his old chief, Mr. H. E. Blain, of the London Underground Railways. The tramways committee have accepted Mr. Eggington's resignation, and have recommended that Mr. Hopkins be appointed to the position at a salary of £250 per annum, rising by annual increments of £25 to £300 The committee have appointed Mr. A. C. Debenham to be accounts clerk at £200 per annum, rising to £220 by annual increments of £10; and Mr. J. O'Niel to be traffic clerk at £120 per annum, rising by annual increments of £10 to £150. The filling of the post of traffic superintendent, at a commencing salary of £225 per annum, has been left to the tramways manager and the chairman of the Tramways Committee.

**Councillor Rodgers,** chairman of Newcastle Tramways Committee, was elected on November 10, without opposition, to a vacant seat on the aldermanic bench, after 19½ years' service as a councillor. In addressing a meeting of ratepayers Councillor Rodgers said the tramways carried the population four times over per week, which was done by no other city with the exception of Glasgow. They had taken £2,014 on the Westerhope 'buses, and had carried 227,665 passengers. The omnibuses had also proved an admirable feeder to the cars, and the routes concerned had shown increased receipts by £20 a week. Although to concede halfpenny fares at present would do away with the profit on the tramways, such fares would ultimately come, although not before a lot of the present debt on the system had been cleared off.

**Mr. F. H. Corson,** who has been appointed manager of Gloucester tramways while retaining his position as borough electrical engineer, was highly spoken of by the Electricity Supply and Light Railways Committees in the joint report in which they recommended the appointment. The report pointed out that Mr. Johnson, the late manager, was in receipt of £350 a year, and Mr. F. H. Corson, who had been engineer and general manager of the electricity works since 1909, received £400, and was allowed to take one pupil. Mr. Corson had rendered most efficient service in connection with the electricity undertaking, and was well qualified to undertake the general management of both undertakings. He was willing to undertake the dual duties subject to the appointment of a traffic manager under his supervision and control. The committees also advised that the track repair and maintenance should be entrusted to the Streets Committee, subject to the adjustment of expenses, and that the electricity and light railways undertakings should be placed under the management of a single committee.

**Mr. George Herman Anger,** managing director of the Anger Manufacturing and Supply Company, Limited, of Preston, recently returned from America. During his stay there Mr. Anger made an extended tour through the United States and Canada in the interests of the Anger brake adjuster, and attended the Convention of the American Electric Railway Manufacturers' Association. The Anger device was exhibited at the exhibition held in connection with the Convention. The adjuster was displayed in actual working conditions on a full sized model truck, and attracted much interest. The Ackley Company are the sole manufacturers and selling agents for the brake adjuster in the United States, and they have received orders from various large systems, among them being the systems of New York City and Brooklyn. Among recent orders received are those from Shanghai, Hong Kong, Pretoria, Durban, Port Elizabeth, Buenos Ayres, Para, and other places abroad. The Santos Tramways Company recently ordered 72 sets, and the same number is being supplied to the Anglo-Argentine Tramways.

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**The Late Mr. T. Frame Thomson,** a director of several South American tramway companies, has left estate valued at £47,183 net.

**Mr. Alfred S. Giles,** general manager and engineer-in-chief of the Lisbon Electric Tramways Company, has died from enteric fever. He began his career on the engineering staff of the Edison Company, Limited, and afterwards served with Thompson, Ritchie, and Company. In 1904, while holding the position of engineer to Blackburn Corporation electricity department, he was appointed engineer-in-chief to the Cape Tramways Company, and early in 1911 he was transferred to Lisbon. During his tenure of the latter offices he dealt successfully with labour and revolutionary troubles, and came to be held in high esteem by the staff as well as by the directors of the company.

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## CONTRACTS AND ORDERS.

**Chamberlain and Hookham, Limited,** have received a contract for meters from Ipswich for 10 amperes and upwards.

**W. A. Stevens, Limited,** Victoria Street, Westminster, have supplied a petrol-electric omnibus to Leeds Corporation Tramways.

**The Lorain Steel Company** have secured the contract for special track work, amounting to about £42,000, for the St. Petersburg tramways.

**E. Bennis and Company, Limited,** have received a repeat order from Barnsley Council for four mechanical stokers and self-cleaning compressed air furnaces.

**Sunderland Council** have allotted contracts as appended: Union Cable Company and I.R. and G.P. Company, cable; E. Green and Sons, new sections and parts for economiser.

**Derby Council** have sanctioned a proposal by the Tramways Committee to place two automatic point controllers at the junction of Douglas Street and Osmaston Road, at a cost of £80.

**Huddersfield Council** have been recommended by the Electricity Committee to accept the tender of Messrs. Switchgear and Cowans, Limited, for a high-tension switchboard, at £2,259.

**Walsall Council** have accepted the tender of the British Westinghouse Company for the supply of a motor and starter, £27 9s., and of the Callender Cable and Construction Company for laying a length of cable, at £123 17s.

**Aberdeen Council** have accepted the tender of the Brush Electrical Engineering Company to supply their interpole type of motors for six new cars, and of the British Westinghouse Company for controllers and electrical equipment.

**The Titan Trackwork Company, Limited,** of Rutland Works, Sheffield, have received contracts for points and crossings from the following: Barnsley and District Tramways Company, Preston, Manchester, and Bootle Corporation Tramways.

**Mirrless, Bickerton, and Day, Limited,** have been awarded a contract for the supply of a Diesel engine and generator at Worthing Corporation electricity works, at £3,785 for the engine and £683 for the generator. The latter will he supplied by Crompton and Company.

**J. G. White and Company** are carrying out the construction of the electric tramway and lighting systems in Pernambuco, Brazil, for Dodsworth and Company, of Rio de Janeiro. English cars will be used, but the power plant and the rails are of American manufacture.

**Luton Council** have accepted the following tenders: Tudor Accumulator Company, Limited, traction battery of 250 cells, £1,137, less approximately £170 for existing battery; Hudson Economiser Company (1907), Limited, cooling tower of 170,000 gallons capacity, £889.

**Wigan Council** have accepted contracts for installing a new turbine and accessories at the electricity works. Councillor Bickerstaffe mentioned that the Electricity Committee had obtained the very best articles they could get, and they could not be bought cheaper without going to Continental makers.

**Peckham Pendulum Trucks.**—Contracts have been awarded recently to the Brush Electrical Engineering Company, Limited, for Peckham pendulum trucks by the following Corporations, *i.e.*: Bexley Heath, 15; South Shields, 5: and Newcastle-on-Tyne, 12. This is the second order from Newcastle.

**Salford Council** have allotted contracts to the British Westinghouse Company for the supply of two additional potential transformers on the extra high-tension switchboard, at £42 10s., and to J. Wolstenholme and Son for an additional vertical two-stage air compressor at the electricity works.

**Canadian General Electric Company, Limited,** have secured the contract for equipping the sub-station at Rougemont, of the Montreal and Southern Counties Railway; a 300-KW. motor generator set, a bank of transformers, high and low-tension switchboards, lightning arresters, and switching apparatus.

**Glasgow Electricity Committee** have recommended the Corporation to accept the tender of the American Engineering Company to equip one pair of boilers with their stokers at £1,400, on the understanding that if the stokers do not prove satisfactory the company will remove them free of cost to the Corporation.

**The National Rail and Tramway Appliances Company, Limited,** have contracts in hand at the present time for 70 tons of brake blocks for various Government railways. They are also supplying, among other contracts, brake blocks to the Metropolitan Railway, and 7,000 blocks to the London, Brighton, and South Coast Railway.

**The Tudor Accumulator Company, Limited,** recently added six plates to each cell of the battery at Pontypridd generating station. Mr. J. E. Teasdel, the engineer, in reporting on the work, stated that the battery was on load again on the fourth day, and that in view of the heavy demands it was a good thing that they were able to get the work done so expeditiously.

**London and South Western Railway Electrical Scheme.**—Messrs. Scholey and Company, Limited, have received an order for their special tool steel gears and pinions from the British Westinghouse Company for the whole of the equipments required in the electrification of the suburban lines of the London and Sonth Western Railway. This constitutes the largest single order ever placed in this country for gears and pinions.

**Leicester Council** have placed the following contracts: United Electric Car Company, 12 top covers for cars; Walter Scott, Limited, 180 tons of steel rails and six tons of fish plates, £1,273 10s.: T. Wragg and Sons, Limited, 2,800 yards of single-way stoneware conduits, 4 in. diameter, £136 10s.; Bayliss, Jones, and Bayliss, Limited, 1.000 steel tie bars in three lengths, £79 3s. 4d.; and Ibbotson Brothers and Company, Limited, six tons of bolts, nuts, and washers, £141.

**Manchester Corporation** have approved of the following tenders: E. Green and Sons, Limited, renewal and replacement work to economisers at Bloom Street Station; British Thomson-Houston Company, Limited, the Brush Electrical Engineering Company, Limited, and Siemens Brothers Dynamo Works, Limited, requirements of lamps during the period ending June 30 next; Ferranti, Limited, high-tension switch gear; Johnson and Phillips, Limited, cable.

**Warrington Council** have allotted contracts as follow: Low-tension cable, the Union Cable Company, Limited; switchboard feeder panel, Drake and Gorham, Limited; extensions of buildings and plant at the electricity works: Buildings, J. Dolan and Son, £2,738; boiler plant, Babcock and Wilcox, Limited, £2,362; turbo-alternator plant, J. Howden and Company, Limited. £5,843; condenser plant, Worthington Pump Company, Limited, £3,344; economiser plant, Goodbrand and Company, Limited, £203 10s.

**Leicester Council** have adopted the following contracts: J. Chapman and Sons, Limited, of Leicester, builders' work for car repairing shops to be erected in Abbey Park Road, at £1,406; Siemens Brothers Dynamo Works, Limited, building and installing a turbo-generator at Lero electric generating station, with reversible rotary converters, switch gear, etc., and the installation of a rotary converter at Aylestone electric generating station, together with the necessary switch gear, at £20,018; Clarke, Chapman, and Company, steam-raising plant necessary in connection with the additional generating plant at Lero station, at £8,212.

**Glasgow Council** have accepted tenders as subjoined for the tramways department: Cast-steel pipe connections, Babcock and Wilcox, Limited; cast-iron pipe connections, Macfarlane, Strang, and Company, Limited; slide valves, Dewrance and Company; trolley feed cable, St. Helen's Cable Company; insulated bolts, W. C. Yuille and Company, Limited, and J. Hally Craig; traction lamps, General Electric Company, Limited; double cotton-covered copper wire, British Insulated and Helsby Cables, Limited; overhead crane, Alex. Jack and Company; tower wagon chassis, Halley's Industrial Motors, Limited; steel work, etc., Dalhousie depot, Redpath, Brown and Company, Limited; trolley wire, F. Espir.

**Heat-Resisting Grey Enamel.**—The London County Council have placed an order for 500 gallons of heat-resisting grey enamel, at 8s. 6d. a gallon, for plough bases, with Messrs. Pinchin, Johnson, and Company, Bevis Marks, London, E.C. The order was placed on the recommendation of the Highways Committee, who reported that experiments had been carried out with preservatives for treating plough bases in substitution for the compound at present in use, which was affected by heat and was inflammable. So far the most satisfactory results had been obtained from a special heat-resisting grey enamel supplied by Pinchin, Johnson, and Company. This enamel was a good insulator, and this property made it still more suitable for the purpose required. Having regard to the good results of the experiments, the Highways Committee were of opinion that it was desirable to treat all the plough bases in use with the enamel at the earliest possible moment, particularly in view of the approach of winter.

**London County Council** have accepted the following tenders: A. and F. Manuelle and John Fyfe, Limited, 275 tons each of Aberdeen granite paving setts, at 36s. 6d. a ton; A. and F. Manuelle, 150 tons of Guernsey granite paving setts, at 35s. a ton; G. Hayward and Company, Limited, 80 movable platforms for car-washers at Cressy Road car shed and 36 such platforms for use at Camberwell car shed extension, £7 each; Enfield Autocar Company, Birmingham, six motor cars for the tramway department, £1,986; Dennis Brothers, motor lorry for use by the fire brigade, £615; Hardy and Padmore, three dozen each cast-iron feeder pillar cases and cases, £240 8s. 9d; J. Billingham, Cradley Heath, 12 tons of standard flanged tread plate, £198 18s.; Kowley Brothers, Wood Green, erection and completion of Abbey Wood car shed, £16,981; British Insulated and Helsby Cables, one ton of T.C.C. copper wire ·229 in. diameter, and 1½ tons of D.C.C. copper wire ·229 in., for winding field coils, £224 1s. 9d., less 2½ per cent. discount.

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# TRAMWAY AND LIGHT RAILWAY NOTES.

## ABERDEEN.

TRAIL CAR SANCTIONED.

Replying to the observations of Aberdeen Tramways Committee in regard to the application by the Aberdeen Suburban Tramways Company for permission to run trailer cars on their lines, the Board of Trade have stated that they see no sufficient reason to object to the use of trail cars as proposed, provided suitable arrangements for turning were made at the termini.

## BELFAST.

RESPONSIBILITY FOR TRACK MAINTENANCE.

As the result of a discussion on the question whether the general manager's department or the city surveyor is responsible for the maintenance of the tramway track, the Tramways Committee have requested Mr. Nance to obtain information as to the procedure adopted by other municipalities.

## BIRMINGHAM.

STANDING ROOM IN CARS.

The decision of the Tramways Committee to allow six persons to stand in a car resulted in considerable criticism, and the committee have since resolved to permit six persons to stand up to 9-30 every morning, on Saturday afternoons from mid-day, and on bank holidays all day

## BRADFORD.

VESTIBULE CAR BUILDING—SPENCER-DAWSON BRAKE.

What are termed "Dreadnought" cars are now being constructed at the tramways depot at Thornbury, where 225 men are employed in making and repairing the whole of the bodies of the cars used in the Bradford service. Vestibules are fitted to the new cars, which have motors of 50 H.P. These six cars are 19 ft. in length instead of 16 ft., and they are being fitted with the new power brake invented by Mr. C. J. Spencer and the assistant engineer, Mr. J. W. Dawson. It is operated by pneumatic pressure, which compresses two springs to keep the brake in the off position. It is brought into action by reducing the pressure. The Thornbury works are about to be enlarged.

## BRISTOL.

POLL OF RATEPAYERS ON PROPOSED TRAMWAY PURCHASE.

By the statutory majority the Corporation on November 10 carried a resolution authorising the promotion of a bill to permit of the purchase of the Bristol Tramways Company's undertaking, and to take a poll of the ratepayers upon the question of the acquisition of the lines under the Tramways Act, 1870.

## BURNLEY.

GOODS SERVICE ON TRAMWAYS.

The period for which the Board of Trade sanctioned the use of a goods wagon in conjunction with a motor car having expired, application has been made to the Board for consent to continue the use of the wagon. This was described in THE TRAMWAY AND RAILWAY WORLD of December 12, 1912.

## GLASGOW.

FOOTBALL TRAFFIC DIFFICULTIES—CENTRE STANDARDS—SIX STAGES FOR A PENNY—JACKS AND TRUCKS.

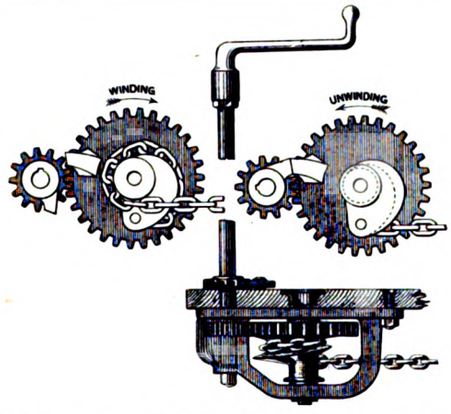
Football spectators who enter tramcars by climbing over the dashboard or the staircase railings are being reported with a view to prosecution under one of the by-laws.—Whilst motorists are urging the removal of the centre standards in the tramway system, others are declaring that there is no evidence of any desire on the part of the ratepayers in Hillhead and Kelvinside for the removal of these instruments of safety for the pedestrian. The poles, it is contended, serve a most useful purpose in splitting the traffic, and if the scorching motorist is compelled to slow down to a reasonable speed the public are all the better pleased.—It was suggested by the convener of the Tramways Committee, at the luncheon following the annual inspection of the tramways and works, that an extension of the number of stages given for a penny from four to six would be a great boon. In January, 1911, the two-stage fare was inaugurated That was the stepping-stone to the doubling of the halfpenny distance. The further reduction which took place in December of that year brought a temporary decline in the revenue, but in a short time the department were drawing a greater revenue than ever. At the end of the year the committee expected that the revenue would show an increase of £50,000 over the £1,007,652 received in the previous year. There were 850 cars in stock, and the manager had been authorised to proceed with the construction of an additional 150 cars. The cars are being equipped with lifting jacks, manufactured at the car works at Coplawhill. It is locally reported that experiments have been carried out there in the construction of trucks, and that several improvements have been effected.

## HULL.

TRAMWAY SIGNALLING APPARATUS.

Pending the presentation of a report by the city engineer on a proposal to install electrical signals at bridges, the Hull Tramways Committee have adopted a suggestion made by the tramways manager


5,258 BRAKES SOLD IN 90 DAYS!




The "Peacock" IMPROVED Brake.

(PATENT).

Note the simplicity of the Radial Contact pieces which render this the quickest of all geared hand brakes by

(1) Preventing the drum from over-running on release;

(2) Stopping the drum always at the point from which recovery of chain is most rapid;

(3) Eliminating all idle turning of the handle.

Metropolitan Building,
New York City, August 26, 1913.

J. McI. Cater, Manager,
Peacock Brake Co.,
London, England.

Dear Mr. Cater:

It affords me pleasure and is only fair to inform you that the Peacock Improved Brake, shipped by you from England last Fall, was tested under the supervision of the Public Service Commission of this State, and was awarded the highest percentage for efficiency over all other hand-geared brakes - and, rest assured; they were all there. The outcome of this test resulted in the National Brake Co., of Buffalo, N. Y., immediately purchasing the rights from me to manufacture and sell the Peacock Improved Brake in the United States.

We have thus far only shown it to the companies mentioned below who have purchased the following number of brakes within the last ninety days.

| | |
|---|---|
| The Brooklyn Rapid Transit Co. | 4036 |
| Second Avenue Railway Co. | 550 |
| New York Street Railways Co. | 440 |
| Third Avenue Railway Co. | 102 |
| Belt Line Railway Co. | 80 |
| Manhattan & Queens | 50 |
| Total Number Brakes Sold | 5258. |

To my mind your success in Europe, and the initial sales in the United States, speak well for the future of the Peacock Improved Brake.

Yours sincerely,

The "PEACOCK" BRAKE CO., 27, Clements Lane, LONDON, E.C.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that orderly boys should operate signals so that arrangements could be made to divert tramcars to other routes when a bridge is about to be opened to allow shipping to pass. The engineer has been in negotiation with a number of firms with regard to the supplying of an apparatus, but he has experienced great difficulty in obtaining designs of anything that would be suitable.

### LIVERPOOL.

THE GOODS-CARRYING PROPOSALS.

Several members of the City Council who are conversant with the needs of the port, as regards relief from traffic congestion, have commented favourably upon the scheme presented by the tramways manager for the construction of tramways for the conveyance of goods to South Lancashire. Mr. Philip D. Holt can see no reason why the merchant shippers should not guarantee a traffic of at least 1,314,000 tons, as asked for by Mr. Mallins, for that figure represented only about 4 per cent. of the traffic of the port. The carriage by tramway of even 4 per cent. of traffic would do something to ease the pressure at the docks, without doing injury to the railway companies or firms of carriers, which he and others were anxious to avoid. If it competed with anything, the tramway service would be a rival to motor lorries.

### LONDON.

CENTRAL CAR REPAIRING WORKS—THROUGH RUNNING—PETROL ELECTRIC CARS—QUEUES.

The central car repair works of the London County Council Tramways are making progress towards completion. The buildings are situated at Charlton, on the way to Woolwich, and the works are connected by a siding with the South Eastern Railway. Eleven tenders were recently received from selected firms for the erection of the third section, the tenders varying from £25,690 to £30,750, the architect's estimate being £27,600. The Council have accepted the lowest tender, that of Charles Wall, Limited.—Bexley Council have authorised their tramways manager to confer with the chief officer of the London County Council Tramways with reference to through running of cars between London, Bexley, and Erith.—As the result of experimental running of petrol-electric tramcars from Tooley Street to Greenwich Church, the Highways Committee of the London County Council have reported that the Burdett Road and Grove Road horse tramways route would not be suitable for working by means of such cars.—With the assent of the City of London Corporation, the County Council are promoting a bill to authorise extension of tramways in several thoroughfares under the Corporation's control, notably in Farringdon Street to a point near Ludgate Circus.—A by-law with regard to the formation of queues by intending passengers on the Council's tramcars has been approved of by the Home Secretary. On November 18 the Council adopted a by-law to deal with obstruction caused by the breakdown of vehicles.

### MANCHESTER.

VISIT OF OFFICIALS TO THE CONTINENT—"SAFETY FIRST"—TICKET INSPECTORS.

The chairman of the Watch Committee and the chief constable are preparing a report on their recent visit to several Continental cities in order to investigate the traffic methods adopted there in order to minimise accidents. It is stated that the notice placed in tramcars asking people to be on the look out for passing vehicles as they alight from the cars, has had the effect of reducing the number of such mishaps. Interviewed with reference to a complaint that ticket inspectors are too numerous, Mr. J. M. McElroy has said: "We have no more ticket inspectors than are necessary. In fact, we have not enough. We are collecting nearly one million pounds, or near that, every year, and that we are carrying four million passengers per week. We have less than 40 ticket inspectors, and their hours are so arranged that they are on duty the whole time the cars are running, which is now day and night."

### NEWCASTLE.

A QUESTION OF BRAKES.

The remaining mile of the tramway extension to Lemington has been opened by running cars to and from Lemington to Sandy Banks, Newburn. The Heaton-Lemington line was opened last August, but the Board of Trade refused to sanction the running of cars beyond Lemington until the vehicles were fitted with powerful brakes, in view of the short steep gradient at Northumberland Road.

### PLYMOUTH.

LONG-WHEEL-BASE TRUCKS.

Alderman Phillips has reported to the Town Council that the experiment of trying a car with a longer truck promised to be successful. There was less power used and less strain on the curves. If it succeeded they might apply to the Board of Trade for permission to use top-covered cars.

### PRESTON.

ADDITIONAL ROLLING STOCK REQUIRED.

The Council have been informed that it was essential that at least six more cars should be purchased in the immediate future, that the car sheds would need to be enlarged, and the generating plant increased. The reduction of the three-halfpenny fare to a penny on the Penwortham route has been a financial success.

### ROTHERHAM.

TRACK DOUBLING.

In Rotherham, as in a number of other towns, the Corporation have decided to obviate the inconvenience of single track lines by ordering duplication of the tracks in Effingham and Fitzwilliam Roads.

### SHEFFIELD.

TOP-DECK PASSENGER RECKONER.

The tramways department has been experimenting during the past two months with a device, the invention of a local man, for indicating the number of passengers on the upper deck of the cars, and thus showing conductors and intending passengers whether there is any room without giving the trouble of climbing the stairs. The device is connected with two of the steps of the staircase, and pressure upon these steps makes an addition to the number on the dial. When a passenger descends a subtraction is automatically made.

### TYNESIDE.

SIGNALLING INDICATORS.

A recommendation in favour of indicators being placed on all single lines between loops was made by the jury at the inquest on a conductor who was killed as the result of a collision in a fog between a trolley wagon and a tramcar on a system of the Tyneside Tramways Company. Mr. F. H. Briggs, resident engineer to the company, stated that where there were obstructions to the view of the drivers there were indicators at curves between the loops, but on the Gosforth track these indicators were not necessary.

### WALTHAMSTOW.

OMNIBUS OBSTRUCTION—A TRAMWAY SIDING.

In consequence of the obstruction of tramway traffic caused by omnibuses stopping to pick up and set down passengers on the tramway track in Hoe Street, the Town Council have requested the Commissioner of Police to put a stop to the practice. The Metropolitan Stage Carriage Act provides that such vehicles shall draw alongside of the pavement when taking up and putting down passengers. In order to add to the convenience of passengers, application has been made to the Great Eastern Railway by the tramways manager, Mr. W. Murray, for the construction of a tramway siding at Hoe Street Station.

## PATENT LIST.

**Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.**

***** If the inventions have been communicated the names of the communicators are given below in italics.**

### APPLICATIONS.

Applications for Letters Patent have been filed:

24,963 Electric bell signalling for railway purposes—F. Raybould.
24,988 Audible signalling apparatus—W. Dudley and E. H. Dudley.
25,006 Three-position block instrument for railway and tramway purposes—McKenzie and Holland, Limited, and C. H. W. Edmonds.
25,018 Electric railway signalling and means therefor—Siemens Brothers and Company, Limited, and J. Boot.
25,092 Anti-side splash mud-preventer for motor omnibuses—F. G. Reason.
25,129 Electric apparatus for automatic track signalling on railways—E. W. Bottle.
25,164 Control of electric motors on traction systems, etc.—R. F. Baerlocher.
25,179 Process and apparatus for welding rails—Th. Goldschmidt Akt.-Ges.
25,234 Wind and weather screens for tramcars—G. Morris.
25,246 Permanent way—C. Pasel.
25,263 Brakes for tramway vehicles—F. van der Straeten.
25,350 Train control systems—A. Kerr.
25,363 Electrical conduit systems—M. Railing and T. Taylor.
25,385 Electric storage batteries—G. Inrig and G. J. Mills.
25,391 Continuous brakes and brake controllers—W. R. Smith.
25,462 Collapsible top for omnibuses—J. Graham and H. H. Fyfe.
25,473 Electrical lighting of trains—G. Inrig, Limited, and G. Inrig.
25,479 Cooling arrangements for electric locomotives—Siemens-Schuckertwerke G.m.b.H.
25,544 Fittings for electrical conduit systems—D. L. J. Broadbent.
25,627 Metal-welded joints—A. O'Malley.
25,636 Automatically controlling railway trains—W. S. Beck.
25,671 Vacuum brake apparatus—F. J. Gresham and G. Kiernan.
25,676 and 25,677 Railway car seats—F. Bennett.
25,679 Railway chairs and chair keys—O. Imray *(J. W. Stephenson)*.

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25,697 Rail joints—W. T. Sapp.
25,776 Fish joint for railways—C. M. Knudsen.
25,790 Insulating covering for overhead wires—G. H. Vaughan.
25,832 Machines for treating compound rails—J. Noll.
25,875 Self-holding hinge for suspending indicators in tramcars, etc.—J. Robson.
25,901 Electric signalling system for railways—C. C. Wilson.
25,917 Engines for traction on centre-rail railways—G. N. Fell and J. H. Tindall.
26,198 Pulleys for the trolleys of electric cars—A. Welsh.

**PATENT WEATHER SCREEN FOR MOTOR 'BUSES.**
**NO GLASS.** Instantaneously opened and closed.
**ADJUSTABLE TO ANY DRIVER. NO REFLECTED LIGHTS.**
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***91, New Canal Street, BIRMINGHAM.***

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**SCOTLAND STREET, GLASGOW.**

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*Manufacturers.*
Dairy, near Glasgow.

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"Motorman's Oilskins supplied by you gave every satisfaction."
"The oilskin coats we now use are entirely confined to the 'Ailsa' manufacture."
"We have tried several makes of Oilskins, but none have been equal to the 'Ailsa' make."
"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

26,226 Electric signalling system—C. C. Wilson.
26,342 Splash-guard for motor omnibuses—D. Hayes.
26,368 Wind and rain-guard for omnibuses, trams, etc.—A. C. Adams.
26,389 Brake apparatus—O. J. Broomhead and L. J. Kitchener.
26,489 Railway ties or sleepers—A. F. Brown *(W. R. Gorrell)*.
26,564 Anti-splasher for motor omnibuses—W. H. Brough.
26,610 Automatic braking device—F. A. G. Noel.
26,630 Fluid-pressure braking apparatus—J. W. Cloud.
26,700 Electro-pneumatic continuous brake—F. V. le Manquais and J. W. Sims.
26,837 Flexible lock joints for car bodies and trucks—J. McC. Coleman.
26,855 Electric railway block-signalling—P. Browne.
27,163 Trolley retrievers—F. A. Wasson.
27,180 Sanding means for train-stopping device—A. E. Hudson.
27,226 Automatic control mechanism for the engines and brakes of railway trains—P. Browne.
27,272 Passenger registers for tramcars—E. Priestman.
27,285 Mud and life-guards for motor omnibuses—G. W. Sutton.
27,295 Device for safe working on railways and tramways—T. R. Barlow.
27,296 Brakes—T. Birks.
27,298 Electric tramcar trolley-pole wheel guides—C. E. Bingley.
27,434 Motor omnibus guard for front wheels of motor omnibuses—E. J. Matthew.

## Specifications Published.

### 1912.

23,279 Electrical apparatus for controlling electric motors for railway points—Gath.
26,427 Anti-splash arrangements for motor omnibuses—Price.
28,966 Rail joints—Georgs-Marien-Bergwerks und Hutten-Verein Akt.-Ges.
29,873 Clamps for preventing the creeping of railway rails—Imray *(Stephenson)*.
24,417 Axle journal boxes—Curwen *(J. G. Brill Company)*.
24,752 Fare box or ticket receptacle—Tanner.
26,414 Casings of motors for motor-driven vehicles, and means for draining them—Forrest.
25,819 Apparatus for taking the profile of rails—Shorter.

### 1913.

2,698 Brakes for vehicles—Power.
3,750 Life-saving appliances for use in connection with railway and road vehicles—Turner and White.
9,474 Means for adjusting the gauge of railways—Imray *(National Malleable Castings Company.)*
12,580 Laminated bearing spring for railway wagons and tramcars—Addis.
17,087 Trucks for railway and tramway vehicles—Brooks.
16,817 Passenger cars—Jones.
3,567 Lubrication of the wheels and axles of railway and tramway
12,473 vehicles—Abbott.
10,572 Rail joint—Sparling.
11,310 Suspension of overhead line wires for electric traction—Soc. Vedovelli, Priestley, et Cie.

# TRAFFIC RETURNS.

## Colonial and Foreign Tramways.

| NAME OF COMPANY. | 1912. WEEKS ENDING. | | | | 1913. WEEKS ENDING. | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nov. 9. | Nov. 16. | Nov. 23. | Nov. 30. | Nov. 8. | Nov. 15. | Nov. 22. | Nov. 29. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Anglo-Argentine ... ... ... | 57.910 | 56,478 | 55,377 | 54,552 | 59,095 | 51,517 | 58,239 | 58,300 | 48 | 2,663,349 | +193,051 |
| Auckland ... ... (28 days) | ... | ... | 19,174 | ... | ... | ... | 10,497 | ... | 20½ | 92,254 | - 4,949 |
| Brazilian Street ... (month) Mirs. | 44,563 | ... | ... | ... | 52,219 | ... | ... | ... | 13 | 153,572 | + 26,509 |
| Brazilian Traction ... ... ... | 87,269 | 85,852 | 84,515 | 81,409 | 90,380 | 93,361 | 92,490 | 92,758 | 48 | 4,324,500 | — |
| Brisbane ... ... ...(month) | 23,017 | ... | ... | ... | 27,250 | ... | ... | ... | 43 | 260,018 | + 55,907 |
| British Columbia ... (month) $ | 721,621 | ... | ... | ... | 753,501 | ... | ... | ... | 31 | 3,014,355 | +279,148 |
| Buenos Aires Port and City (month) | 6,615 | ... | ... | ... | 7,442 | ... | ... | ... | 43 | 68,109 | 5,294 |
| Buenos Ayres Lacroze ...(month) | 44,660 | .. | ... | 44,671 | 45,579 | ... | ... | 45,746 | 22 | 225,270 | + 8,901 |
| Calcutta ... ... ... Rs. | 58,922 | 64,432 | 64,320 | 66,550 | 65,104 | 69,814 | 67,754 | 66,424 | 48 | 30,99,024 | +1,47,691 |
| Cape Town ... ...(month) | 11,455 | ... | ... | ... | 12,223 | ... | ... | ... | — | — | — |
| Carthagena and Herrerias (month) | 2,376 | ... | ... | 1,703 | 1,582 | ... | ... | 1,922 | 48 | 28,165 | + 4,820 |
| Cordoba ... ... ...(month) | 12,524 | ... | ... | ... | 13,285 | ... | ... | ... | 31 | 94,023 | + 9,230 |
| East India (Simplex petrol) (month) | 1,911 | ... | ... | ... | 1,878 | ... | ... | ... | 13 | 5,911 | + 147 |
| Kalgoorlie ... ...(month) | 2,955 | .. | ... | ... | 2,562 | ... | ... | ... | 43 | 29,099 | — |
| La Plata ... ... ...(month) | 5,007 | ... | ... | 5,210 | 4,919 | ... | ... | 5,409 | 48 | 55,840 | + 9,526 |
| Lima ... ... ...(month) | ... | ... | ... | ... | ... | ... | ... | ... | — | — | — |
| Madras ... ... ... Rs. | (2 weeks) 24,262 | | (2 weeks) | 21,902 | (2 weeks) | 24,050 | (2 weeks) | 25,530 | 48 | 5,86,313 | + 41,533 |
| Melbourne ... ...(month) | ... | ... | ... | ... | 65,000 | ... | ... | 63,500 | — | — | — |
| Mexico ... ... (month) $ | 586,273 | ... | ... | ... | 616,007 | ... | ... | ... | 43 | 5,732,338 | +137,633 |
| Montevideo ... ...(month) | ... | ... | ... | 29,623 | ... | ... | ... | 30,530 | 4 | 30,530 | + 907 |
| Para ... ... ... ... | 4,194 | 3,847 | 3,941 | 3,743 | 3,864 | 3,598 | 3,384 | 3,317 | 52 | 206,502 | - 2,691 |
| Port Elizabeth ... ...(month) | 3,336 | ... | ... | ... | 3,553 | ... | ... | ... | — | — | — |
| Shanghai ... ... ... $ | 21,503 | 19,810 | 20,712 | 20,311 | 23,800 | 24,400 | 24,000 | 23,200 | 47 | 1,056,252 | +125,311 |
| Singapore ... ... ... $ | 11,067 | 10,546 | 10,690 | 10,031 | 12,635 | 13,092 | 11,570 | 10,883 | 48 | 573,934 | + 74,445 |
| Toronto ... ... (month) $ | 754,104 | ... | ... | ... | 861,235 | ... | ... | ... | 43 | 8,044,705 | +1069,557 |
| Winnipeg ... ... (month) $ | 321,039 | ... | ... | ... | 357,313 | ... | ... | ... | 43 | 3,338,748 | +280,156 |

*(Continued on page 518.)*

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# TRAFFIC RETURNS—*continued.*

## Tramways and Omnibus Undertakings in the United Kingdom.

| NAME OF COMPANY OR CORPORATION. | 1912. WEEKS ENDING. | | | | 1913. WEEKS ENDING. | | | | AGGREGATE. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nov. 9. | Nov. 16. | Nov. 23. | Nov. 30. | Nov. 8. | Nov. 15. | Nov. 22. | Nov. 29. | Wks. | 1913. | Increase or Decrease. |
| | £ | £ | £ | £ | £ | £ | £ | £ | | £ | £ |
| Aberdeen Corporation | 1,439 | 1,541 | 1,347 | 1,390 | 1,513 | 1,618 | 1,472 | 1,424 | 26 | 43,120 | + 2,719 |
| Accrington Corporation | 504 | 521 | 507 | 512 | 576 | 563 | 562 | 568 | 34 | 19,848 | + 1,882 |
| Ayr Corporation | 200 | 199 | 195 | 189 | 239 | 244 | 239 | 240 | 28 | 12,236 | + 1,737 |
| Bath Electric | 726 | 687 | 690 | 688 | 825 | 775 | 736 | 748 | 48 | 46,240 | + 3,704 |
| Birkenhead Corporation | 1,149 | 1,089 | 1,135 | 1,216 | 1,229 | 1,232 | 1,225 | 1,416 | 35 | 45,551 | + 4,524 |
| Birmingham Corporation | 11,055 | 10,967 | 11,121 | 11,058 | 12,314 | 12,665 | 12,285 | 12,294 | 35 | 411,132 | + 36,255 |
| Blackburn Corporation | 1,126 | 1,204 | 1,113 | 1,110 | 1,249 | 1,230 | 1,139 | 1,284 | 35 | 46,743 | + 4,414 |
| Blackpool Corporation | 527 | 468 | 432 | 438 | 784 | 534 | 504 | 504 | 34 | 74,026 | + 11,884 |
| Bolton Corporation | 2,530 | 2,530 | 2,560 | 2,431 | 2,585 | 2,738 | 2,604 | 2,787 | 35 | 96,375 | + 5,762 |
| Bournemouth Corporation | 1,502 | 1,468 | 1,445 | 1,391 | 1,720 | 1,644 | 1,658 | 1,621 | 35 | 77,293 | + 9,243 |
| Bradford Corporation | 5,463 | 5,216 | 5,389 | 5,035 | 5,581 | 5,569 | 5,589 | 5,594 | 35 | 208,720 | + 13,129 |
| Brighton Corporation | 851 | 768 | 823 | 751 | 877 | 903 | 893 | 854 | 35 | 40,596 | + 2,918 |
| Bristol | 6,574 | 6,508 | 6,432 | 6,675 | 7,719 | 7,537 | 7,275 | 6,915 | 47 | 382,056 | + 51,291 |
| British Electrical Federation | 37,724 | 37,600 | 35,782 | 37,264 | 51,486 | 50,208 | 48,781 | 49,831 | — | — | — |
| Burnley Corporation | 1,536 | 1,445 | 1,463 | 1,446 | 1,593 | 1,654 | 1,579 | 1,631 | 35 | 60,160 | + 7,098 |
| Burton-on-Trent Corporation | 255 | 252 | 264 | 258 | 268 | 297 | 270 | 275 | 35 | 10,249 | + 514 |
| Bury Corporation | 1,279 | 1,211 | 1,225 | 1,158 | 1,298 | 1,260 | 1,254 | 1,339 | 35 | 47,842 | + 2,049 |
| Cardiff Corporation | 2,407 | 2,293 | 2,373 | .. | 2,673 | 2,643 | 2,684 | .. | 34 | 93,815 | + 10,232 |
| Chatham and District | 822 | 793 | 777 | 812 | 921 | 873 | 848 | 812 | 47 | 43,923 | + 2,818 |
| Chesterfield Corporation | 221 | 229 | 224 | 229 | 261 | 256 | 260 | 251 | 34 | 8,999 | + 1,114 |
| Colne and Trawden | 257 | 237 | 247 | 231 | 247 | 254 | 241 | 252 | 48 | 13,142 | + 794 |
| Cork Electric | 473 | 427 | 443 | 444 | 488 | 483 | 457 | 446 | 47 | 23,726 | + 656 |
| Croydon Corporation | 1,698 | 1,646 | 1,666 | .. | 1,626 | 1,570 | 1,546 | .. | 33 | 56,323 | — 5,576 |
| Darlington Corporation | 222 | 225 | 227 | 226 | 243 | 246 | 251 | 242 | 35 | 8,770 | + 861 |
| Derby Corporation | 876 | 904 | 870 | 819 | 939 | 1,051 | 929 | 901 | 35 | 34,743 | + 3,610 |
| Dover Corporation | 202 | 187 | 188 | 188 | 211 | 207 | 197 | 180 | 35 | 9,093 | + 203 |
| Dublin and Lucan | 119 | 111 | 112 | 102 | 117 | 106 | 110 | 112 | 21½ | 3,234 | — 22 |
| Dublin United | 5,462 | 5,105 | 5,436 | 5,317 | 4,901 | 4,785 | 4,722 | 4,747 | 47 | 260,258 | — 15,664 |
| Dundee City | 1,169 | 1,171 | 1,149 | 1,171 | 1,324 | 1,257 | 1,261 | 1,243 | 28 | 37,068 | + 2,836 |
| East Ham Corporation | 1,036 | 1,052 | 1,020 | 1,025 | 969 | 1,018 | 990 | 957 | 35 | 35,835 | — 1,667 |
| Exeter Corporation | 294 | 277 | 273 | 269 | 319 | 311 | 292 | 286 | 35 | 12,330 | + 650 |
| Gearless Motor Buses | .. | .. | .. | .. | 517 | 475 | 474 | 491 | 34 | 16,991 | — |
| Glasgow Corporation | 19,206 | 18,756 | 19,083 | 18,393 | 20,691 | 20,648 | 20,361 | 20,696 | 26 | 527,905 | + 39,550 |
| Glossop (Urban Elec. Supply Co.) | 119 | 119 | 119 | 120 | 115 | 123 | 119 | 122 | 48 | 6,217 | + 599 |
| Halifax Corporation | 1,927 | 1,821 | 1,823 | 1,802 | 2,193 | 1,879 | 1,865 | 1,940 | 34 | 73,800 | + 2,576 |
| Hastings and District | 781 | 727 | 725 | 710 | 834 | 807 | 781 | 765 | 48 | 50,154 | + 3,698 |
| Huddersfield Corporation | 2,047 | 1,863 | 2,009 | 1,953 | 2,022 | 2,071 | 2,007 | 2,052 | 35 | 75,012 | + 4,661 |
| Hull Corporation | 3,002 | 3,051 | 2,978 | 3,027 | 3,121 | 3,243 | 3,164 | 3,170 | 35 | 109,986 | + 6,063 |
| Ilford U.D. Council | 369 | 389 | 389 | 391 | 445 | 447 | 428 | 433 | 35 | 15,897 | — 957 |
| Ilkeston Corporation | 110 | 114 | 114 | 109 | 126 | 133 | 125 | 127 | 36 | 4,822 | + 762 |
| Ipswich Corporation | 368 | 374 | 351 | 356 | 397 | 415 | 393 | 364 | 35 | 16,682 | + 726 |
| Isle of Thanet | 335 | 276 | 275 | 267 | 364 | 343 | 333 | 323 | 9 | 3,525 | + 438 |
| Kilmarnock Corporation | 153 | 152 | 152 | 148 | 159 | 165 | 162 | 166 | 28 | 5,042 | + 356 |
| Lanarkshire | 1,568 | 1,453 | 1,526 | 1,496 | 1,851 | 1,786 | 1,707 | 1,828 | 47 | 81,118 | + 10,471 |
| Lancashire United | 1,344 | 1,295 | 1,291 | 1,306 | 1,610 | 1,551 | 1,557 | 1,551 | 47 | 73,641 | + 9,082 |
| Leeds City | 7,722 | 7,474 | 7,735 | 7,432 | 8,009 | 7,969 | 7,956 | 8,093 | 35 | 290,816 | + 18,445 |
| Leicester Corporation | 2,543 | 2,576 | 2,581 | 2,606 | 2,765 | 2,866 | 2,776 | 2,796 | 48 | 134,520 | + 12,380 |
| Leith Corporation | 609 | 600 | 619 | 600 | 677 | 659 | 637 | 663 | 28 | 20,513 | + 1,012 |
| Leyton U.D. Council | 1,184 | 1,262 | 1,244 | .. | 1,238 | 1,286 | 1,271 | .. | 33½ | 45,615 | — 516 |
| Liverpool Corporation | 12,460 | 11,693 | 11,991 | 11,851 | 12,969 | 12,966 | 12,719 | 12,793 | 48 | 616,808 | + 46,565 |
| Llandudno and Colwyn Bay | 159 | 143 | 141 | 160 | 163 | 152 | 156 | 191 | 52 | 17,710 | + 1,511 |
| London County Council | 40,588 | 41,222 | 40,248 | 41,091 | 43,202 | 43,523 | 42,565 | 41,687 | 34 | 1,448,122 | + 1,727 |
| London General Omnibus | 58,403 | 55,366 | 55,947 | 54,147 | 59,909 | 57,366 | 57,083 | 59,002 | 48 | 2,969,665 | + 505,673 |
| London United | 5,484 | 5,415 | 5,405 | 5,356 | 6,043 | 5,835 | 5,668 | 5,490 | 48 | 301,546 | + 6,222 |
| Lowestoft Corporation | 172 | 193 | 163 | 163 | 196 | 197 | 195 | 171 | 8 | 1,694 | + 143 |
| Maidstone Corporation | 167 | 157 | 156 | 160 | 196 | 184 | 196 | 178 | 35 | 7,348 | + 527 |
| Manchester Corporation | 16,907 | 15,971 | 16,777 | 16,568 | 17,110 | 17,416 | 17,344 | 17,616 | 35 | 617,579 | + 31,497 |
| Metro. Electric Tramways | 8,531 | 8,452 | 8,212 | 8,374 | 9,106 | 9,038 | 8,691 | 8,411 | 48 | 433,284 | + 14,980 |
| Nelson Corporation | 191 | 175 | 185 | 195 | 178 | 216 | 179 | 218 | 35 | 7,451 | + 446 |
| Newcastle-on-Tyne Corporation | 4,515 | 4,508 | 4,541 | 4,410 | 5,012 | 5,015 | 4,994 | 5,054 | 35 | 170,983 | + 16,220 |
| Newport (Mon.) Corporation | 704 | 693 | 687 | 692 | 784 | 776 | 766 | 769 | 35 | 27,061 | + 2,256 |
| New St. Helens and District | 698 | 685 | 670 | 696 | 773 | 747 | 741 | 738 | 22 | 18,583 | + 1,981 |
| Northampton Corporation | 512 | 522 | 486 | 506 | 545 | 541 | 540 | 514 | 35 | 20,403 | + 1,369 |
| Nottingham Corporation | 3,081 | 3,152 | 3,100 | 3,152 | 3,327 | 3,335 | 3,318 | 3,235 | 34½ | 116,714 | + 5,435 |
| Oldham Corporation | 2,015 | 1,897 | 1,984 | 1,838 | 2,174 | 2,158 | 2,181 | 2,171 | 36 | 79,889 | + 5,760 |
| Portsmouth Corporation | 1,809 | 1,675 | 1,619 | 1,605 | 2,039 | 1,996 | 1,919 | 1,872 | 35 | 82,729 | + 5,759 |
| Preston Corporation | 801 | 761 | 771 | 759 | 856 | 810 | 830 | 798 | 35 | 31,089 | + 1,973 |
| Provincial | 1,624 | 1,529 | 1,511 | 1,457 | 1,698 | 1,689 | 1,604 | 1,672 | 9 | 15,017 | + 1,077 |
| Reading Corporation | 596 | 599 | 579 | 613 | 754 | 742 | 643 | 645 | 34½ | 24,351 | + 1,942 |
| Rochdale Corporation | 1,520 | 1,393 | 1,418 | 1,383 | 1,550 | 1,545 | 1,486 | 1,549 | 35 | 56,852 | + 2,554 |
| Rotherham Corporation | 854 | 902 | 860 | 818 | 980 | 1,017 | 1,011 | 1,005 | 35 | 35,604 | + 8,231 |
| Salford Corporation | 4,881 | 4,761 | 5,370 | 4,681 | 5,026 | 5,084 | 5,615 | 5,153 | 35 | 184,498 | + 7,953 |
| Sheffield Corporation | 6,964 | 6,946 | 7,047 | 6,798 | 7,263 | 7,524 | 7,435 | 7,473 | 36 | 262,567 | + 21,941 |
| Southampton Corporation | 1,127 | 1,093 | 1,044 | 1,085 | 1,291 | 1,242 | 1,206 | 1,198 | 34 | 46,647 | + 3,054 |
| Southend-on-Sea Corporation | 562 | 552 | 534 | 548 | 756 | 702 | 700 | 671 | 35 | 35,250 | + 6,143 |
| South Metro. Tramways | 775 | 733 | 725 | 717 | 1,124 | 992 | 1,023 | 956 | 48 | 44,926 | + 4,563 |
| South Shields Corporation | 620 | 604 | 585 | 570 | 677 | 662 | 676 | 657 | 34 | 25,432 | + 3,148 |
| Sunderland Corporation | 1,332 | 1,223 | 1,262 | 1,192 | 1,294 | 1,317 | 1,370 | 1,305 | 35 | 51,114 | + 5,209 |
| Swindon Corporation | 151 | 147 | 148 | 143 | 162 | 158 | 153 | 151 | 34 | 5,806 | + 382 |
| Tramways (M.E.T.) Omnibus Co. | .. | .. | .. | .. | 8,548 | 8,167 | 8,166 | 8,627 | 44 | 240,281 | — |
| Tyneside Tramways and Tramroads | 451 | 446 | 454 | 445 | 487 | 458 | 467 | 462 | 22 | 11,523 | + 739 |
| Wallasey Corporation | 1,034 | 962 | 1,008 | 988 | 1,094 | 1,100 | 1,079 | 1,084 | 35 | 43,579 | + 4,117 |
| Walsall Corporation | 581 | 577 | 582 | 582 | 632 | 656 | 633 | 621 | 48 | 29,920 | + 2,182 |
| Walthamstow U.D. Council | 627 | 594 | 609 | 592 | 722 | 712 | 703 | 681 | 35 | 26,384 | + 840 |
| Warrington Corporation | 436 | 429 | 421 | 438 | 443 | 451 | 457 | 458 | 35 | 15,018 | + 502 |
| West Ham Corporation | 2,515 | 2,487 | 2,501 | 2,493 | 2,759 | 2,738 | 2,668 | 2,567 | 34½ | 94,450 | + 3,664 |
| Wigan Corporation | 1,401 | 1,361 | 1,342 | 1,354 | 1,487 | 1,551 | 1,496 | 1,499 | 34½ | 51,593 | + 5,195 |
| Wolverhampton Corporation | 989 | 965 | 1,009 | 977 | 1,061 | 1,029 | 1,041 | 1,058 | 36 | 38,682 | + 2,220 |
| Yorkshire (West Riding) | 1,331 | 1,518 | 1,283 | 1,191 | 1,557 | 1,442 | 1,393 | 1,400 | 48 | 69,621 | + 7,313 |

## Electric Railways.

| NAME OF COMPANY. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Central London | 5,560 | 5,578 | 5,494 | 5,889 | 5,120 | 5,546 | 5,252 | 5,142 | 48 | 233,400 | — 747 |
| City and South London | 3,140 | 2,999 | 2,899 | 3,127 | 2,707 | 2,880 | 2,816 | 2,687 | 48 | 133,430 | — 440 |
| Liverpool Overhead | 1,598 | 1,589 | 1,525 | 1,545 | 1,668 | 1,703 | 1,686 | 1,761 | 48 | 82,326 | + 6,302 |
| London Electric | 14,350 | 14,860 | 14,050 | 14,985 | 14,370 | 15,170 | 14,350 | 14,270 | 48 | 653,545 | — 715 |
| Mersey | 2,223 | 2,170 | 2,281 | 2,179 | 2,191 | 2,128 | 2,258 | 2,110 | 48 | 107,133 | + 4,702 |
| Metropolitan | 16,712 | 16,663 | 16,316 | 16,896 | 17,972 | 18,380 | 17,981 | 18,199 | 48 | 827,777 | + 29,542 |
| Metropolitan District | 13,634 | 13,919 | 13,238 | 13,839 | 13,455 | 14,230 | 13,440 | 13,646 | 48 | 623,308 | — 193 |

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Telegraphic Address: **"Tramigro," London.**

**Amberley House, Norfolk St., W.C.**

### TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

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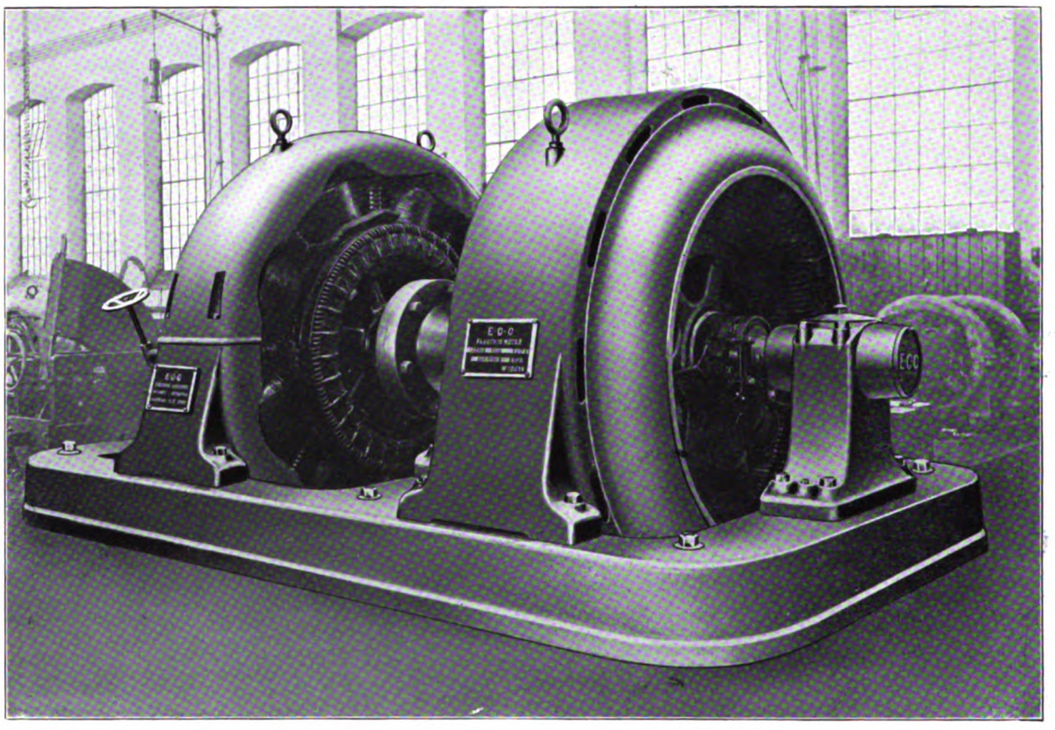
AND

## SWITCHGEAR

OF EVERY DESCRIPTION.



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BUSHBURY,

**WOLVERHAMPTON.**

11


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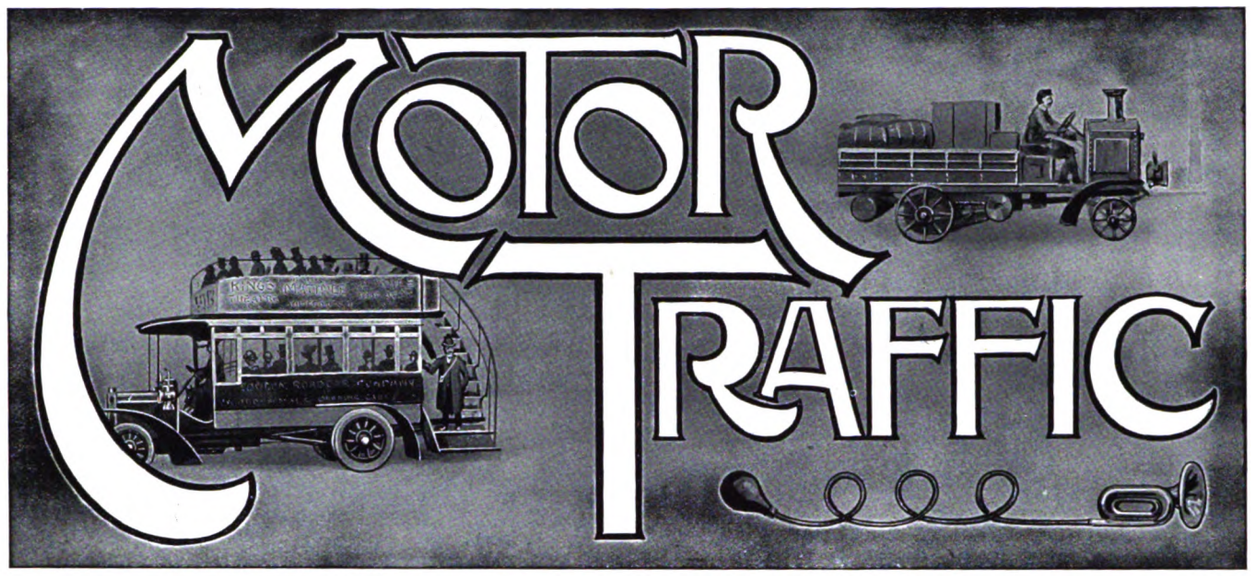


Evidence of the advance of the motor omnibus is afforded by the number of applications to be made in the next Parliamentary session by municipal and company tramways for powers to run that class of vehicle. A record total of 18 will engage the attention of Parliamentary Committees, the applications coming from some of the largest as well as from several of the minor local authorities. The former include Glasgow and Birmingham. In the midland city negotiations are on foot for acquiring the undertaking of the Omnibus Company, whose services supply a public want in those portions of the city unprovided with tramways. This enterprise is so much appreciated that a number of new routes have recently been sanctioned by the Watch Committee, while the last omnibus for the day from one of the distant suburbs is permitted to accept passengers for the centre of the city. While the company is not further allowed to run in competition with the tramway undertaking, Birmingham perhaps affords the best example, outside of London, of the travelling public having the opportunity to judge of the merits of the two forms of traction side by side. It is quite possible that the tramway management has profited by the experience, and that as soon as the department acquire a sufficient number of omnibuses a scheme will be put into operation for the use of routes other than tramway streets, and possibly of some of the latter, in order to provide express services, unimpeded by the congestion which prevails in the centre of the city. Among the cities owning tramways, Sheffield promises to become the possessor of the largest number of municipally-owned omnibuses, for those which were introduced early in the year are giving results so satisfactory that the Tramways Committtee are engaged on a project for increasing the fleet, in order to link up districts from 12 to 15 miles beyond the boundaries. With this purpose in view the Corporation have included in their Parliamentary bill a clause to enable the vehicles to traverse outside districts. The invasion will be welcomed, for neighbouring authorities have had opportunities afforded them of becoming acquainted with the merits of the vehicles, while the city stands to gain additions to both its tramway revenue and its trade.

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It is in effecting extensions of their transit facilities that numerous municipal and company tramways have found the internal combustion engine of great value, and the reports that will be forthcoming after the close of the year ending March 31 next will be a factor in determining the attitude of many other Corporations. It would add to the interest if during next year one or more municipalities adopted the suggestion made at the Municipal Tramways Conference by Mr. Fearnley, the general manager of Sheffield Corporation Tramways, for the testing of omnibuses on heavy traffic routes. In the interest of both the vehicles and the ratepayers it would be necessary to provide a suitable road surface, and if double-deck conveyances are run the material would have to be something more lasting than plain macadam. There need be no fear as to the popularity of "the poor man's motor car." An amusing instance of preference for the omnibus may be cited from Oldham, where two petrol-electric vehicles have been run in extension of a tramway route during and since the past summer. On their first and last journeys the machines are run over the tramway route to the depot, with the result that the tramcars lose custom, notwithstanding that a higher fare is charged for the competing vehicles. Early in the coming year an interesting experiment in motor traction will be initiated at Edinburgh, where in 1919 the Corporation will have to determine the future method of public transport on the termination of the company's lease of the cable tramways. As objection has always been taken to the overhead system for the city, the Council have decided to test six motor omnibuses on a southern route. A similar objection is responsible for Oxford still being served by horse cars. Offers by the National Electric Construction Company to provide potrol-electric tramcars on the inner route, and overhead for the outer sections, have been rejected, owing to trouble over penalties alleged to be due from the company for failure to carry out the electrification.

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An excellent testimonial to the motor omnibus is given by the Oxford Tramways Company now offering to take up the horse tramways, to run omnibuses, and to pay a rental of £500 a year if the Corporation will hand over the sum of £20,000 for the company's tramway rights. Although the Tramways Committee recommended the acceptance of the offer, conditionally on the company paying a rent of £800 and the reduction of the sum payable by the Council to £15,000, the Corporation in General Purposes Committee have not accepted the recommendation. The company have embodied their scheme in a bill, to come before Parliament next year. Matters have been complicated by an Oxford resident having made application to the Watch Committee for licences to run Daimler omnibuses. The latest instance of a tramway company

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# MOTOR TRAFFIC.

adopting omnibuses is to be seen in the Parliamentary application by the Norwich company, who intend to use them as an auxiliary to the tramways. One of the most convincing and concise statements yet written on the respective applications of the two forms of traction has been placed before the citizens by Mr. F. W. Ketley, the tramways manager and engineer. It is given in another column. Among Corporations already operating omibuses, Liverpool is about to increase the number of these vehicles run in connection with the tramways. This is in consequence of the good results already achieved. During a recent visit to London the Tramways Committee made provisional arrangements for the purchase of six omnibuses, including additional Tilling-Stevens petrol-electric, and others of petrol and steam propulsion. In addition to linking up the railway termini, the Tramways Committee are credited with the intention of experimenting with the omnibuses on certain tramway routes on which track renewals will be required shortly. The committee mean to investigate the motor omnibus question very thoroughly, and to put themselves in a position to supply any public demands that may arise in the same way as would be done by an enterprising company. It is a policy which deserves every encouragement.

In other countries the motor omnibus is also becoming popular. New York has services in Fifth and Seventh Avenues, and the omnibuses are so besieged by full journey passengers that the fare has been fixed at 5d. for the distance of seven miles. Application has been made by a new company for a franchise to run London-built vehicles, under which New York would be divided into two-mile zones, the fare to be 2½d. per zone with a free transfer to one other zone. Unlimited transfers are proposed for a fare of 5d., the maximum journey being 12 miles. London General vehicles are to be adopted in Montreal by the Canadian Autobus Company, whose president, Mr. D. Macdonald, an ex-manager of some of the old Paris tramways, and of the Montreal Street Tramways, has been making an investigation of the London services. Several omnibus routes are being worked in Melbourne by companies, and it is noteworthy that the Premier of Victoria is of opinion that if the new form of traction is not properly controlled it will prove a serious menace to tramway interests. This statement was uttered in the course of a speech which the Premier made in introducing a bill "to create and equip a new municipal organism within the metropolis for the discharge of and development of many important functions at present either dormant or in the hands of various local governing bodies." The Council is to be empowered to control omnibus traffic, and to prescribe the routes and areas in which the omnibuses may not run. The Council is also to have the right to construct and operate tramways when the company's lease expires.

Sooner than had been expected there is a likelihood of the Law Courts being called upon to consider one aspect of a refusal of local authorities to grant licences for the running of omnibuses. The question at issue is not that of competition with municipal tramways, but of granting licences to the Kidderminster and District Electric Traction Company. Kidderminster and Stourport Councils had both refused the company's application to be placed on the same footing as Messrs. Allen, of London, to whom licenses had been issued. A number of members of the first-mentioned authority were in favour of issuing permits to both companies, but the majority supported a motion by the Mayor that the outside company should be licensed to run to Bewdley, the Mayor stating that competition was required. When threatened by the Tramways Company with an application to the High Court for a mandamus, the Stourport Council decided to adhere to their previous decision.

The latest report of remunerative running of motor omnibuses by tramway companies was made at the annual meeting of the Provincial Tramway Company. It was then remarked that not only had mechanically-propelled road cars increased the profits but had warded off competition from the tramways. The latter experience fell to the lot of the Metropolitan Tramways Company in a remarkable manner on two or three days at the end of November, during an interruption of the Harrow Road section owing to a break down at the power-station. For 18 months the company has been running its own omnibuses on through London routes, as a unit in the allied companies, and during the cessation of the tramway traffic the void was filled by the loan of omnibuses by the London General Company.

## TO WEIGH MOTOR WAGONS.

At the International Road Congress a machine was exhibited that is being introduced in Lancashire, which ensures that the weight carried by heavy motors does not exceed the maximum laid down by the Heavy Motor Act, 1904, viz., eight tons on each axle. The machine can also be used to test the motor from time to time in order to ensure that the balance and lay of the machine has not been seriously affected by wear. The apparatus consists of two weighing platforms placed end to end, having capacities of 10 tons each with steelyards connected with each and one to take the combined load. The weight on either axle can then be read on either axle or the combined load by divisions of 7 lb. The machine is equally serviceable to weigh ordinary wagon loads up to 20 tons by 7 lb. divisions. There are no hand levers to be manipulated, no loose weights to be mislaid or misread, and the three steelyards are always in gear. At the time of weighing the weight is indelibly printed on a ticket. The machine has been installed at Darwen, and was manufactured by W. and T. Avery, Limited, Birmingham, and we are informed it has given complete satisfaction to the authorities.

Reduced Speed for London Omnibuses in a Kensington Street.—Application was recently made on behalf of the Royal Borough of Kensington, for the issue of regulations prescribing a maximum speed not exceeding eight miles an hour for motor 'buses, and 10 miles an hour for ordinary motor vehicles in Church Street, Kensington High Street, etc. At the inquiry held by the Local Government Board, the application was opposed by the Royal Automobile Club and the Automobile Association, while representatives of the Metropolitan Police expressed the views of the Commissioner against the proposed reduced speed limits. The Local Government Board have now intimated that they have decided to comply with the application so far as it relates to Church Street. When the necessary sign posts are ready for erection, the Board will issue an order restricting speed of all heavy motor cars (*i.e.*, over two tons in weight unladen) to eight miles an hour, and of other motor cars to 10 miles an hour. The Local Government Board have also issued an order reducing the speed of motor vehicles to 10 miles an hour in St. John's Road, Battersea, and to eight miles in the portion of Green Street, Bethnal Green, between Globe Road and Regent's Canal Bridge.

Brighton and Omnibus Transit.—The Brighton Corporation have decided not to make provision in their Parliamentary bill for the Council to insist upon the payment of a royalty, or a lump sum of money, or proportion of receipts, as a condition of granting licences to any omnibus company or to any other company seeking privileges in the nature of public monopolies.

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# MOTOR TRAFFIC.

## TILLING'S NEW CHASSIS MODELS.

The advantage of motor vehicles where reliability is of the utmost importance is rapidly being recognised in all branches of public service, both for the conveyance of goods and passengers. The success of the motor omnibus has induced an increasing number of municipal authorities to consider the question of using motor vehicles for a number of purposes, with the result that in all departments the horse is being gradually superseded. With the railway companies the progress of the mechanically-propelled vehicle has been equally pronounced, and large numbers of machines of various types are now in regular use, both in town and country.

Where a time table has to be maintained reliability and simplicity of construction are essential points to be considered, and it is in this connection that the two models recently placed upon the market by Messrs. Thos. Tilling, Limited, of Peckham, should command the attention of all interested in the running of public service vehicles. Messrs. Tilling were amongst the pioneers of passenger transport in London, and their knowledge and experience in this direction is unique. In the field of motor traction they have to their credit the fact that they ran the first petrol motor omnibus service in London. To-day the most successful petrol-electric system is the Tilling-Stevens combination, and a large number of these machines are running most satisfactorily in London, Birmingham, Liverpool, Newcastle, and elsewhere. This system has become Messrs. Tilling's standard for their omnibus services, and is universally recognised as one of the most practical on the market.

Another important branch of Messrs. Tilling's business is the contract department, which includes the carrying of H.M. mails in various parts of the country. For this purpose a large number of vehicles of various makes have been running for some years past, and it was the valuable knowledge and experience gained in the running and maintenance of these conveyances, and of their omnibuses, that induced Messrs. Tilling to enter the field as manufacturers.

The new commercial chassis, known in the company's works as "B1" and "B2," were designed and built for carrying out a number of contracts for the conveyance of goods, and have now been running for a sufficient time to show that both from an economical and a reliability point of view they are far before anything which Messrs. Tilling have hitherto bought for doing the same class of work.

The "B1" is designed for carrying a useful load of two tons, and the "B2" for a load of one ton. The 2-ton type is now working in arge numbers for the Postmaster-General carrying the mails, and the London County Council are using several of them in connection with their stores department. Every part of the chassis has been built as a result of the experience of Messrs. Tillings's own requirements as operators, and the result is that the chassis as at present marketed are extremely simple, practically no expert attention being required in working them. Thus they are perfectly satisfactory even in the hands of very ordinary drivers.

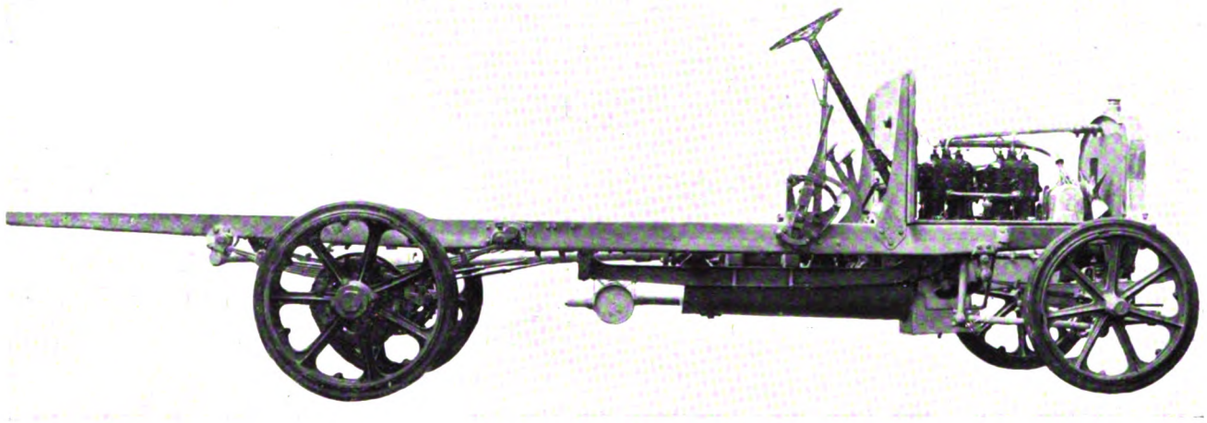

Fig. 1.—Elevation of Tilling's 2-ton Model Chassis.

The cylinders of the 1 and 2-ton vehicles are respectively 80 mm. by 120 mm. (15·9 Royal Automobile Club rating) and 90 mm. by 125 mm. (20·1 Royal Automobile Club rating) bore and stroke, and are cast in pairs. In the case of the 1-ton, thermo-syphon, and for the 2-ton model, centrifugal pump cooling is employed. A cross shaft driven by skew gearing is fixed in front of the engine, and has the pump at one end and Bosch waterproof magneto at the other end. It will therefore be gathered from this that these two important details are very accessible. All valves are interchangeable and on the near side, 3 per cent. nickel steel being used in their construction. Cast iron pistons are used having three compression rings and scraper ring situated low down in the skirt of the piston. These pistons with their rings have a weight limit, and any failing to be within a quarter of

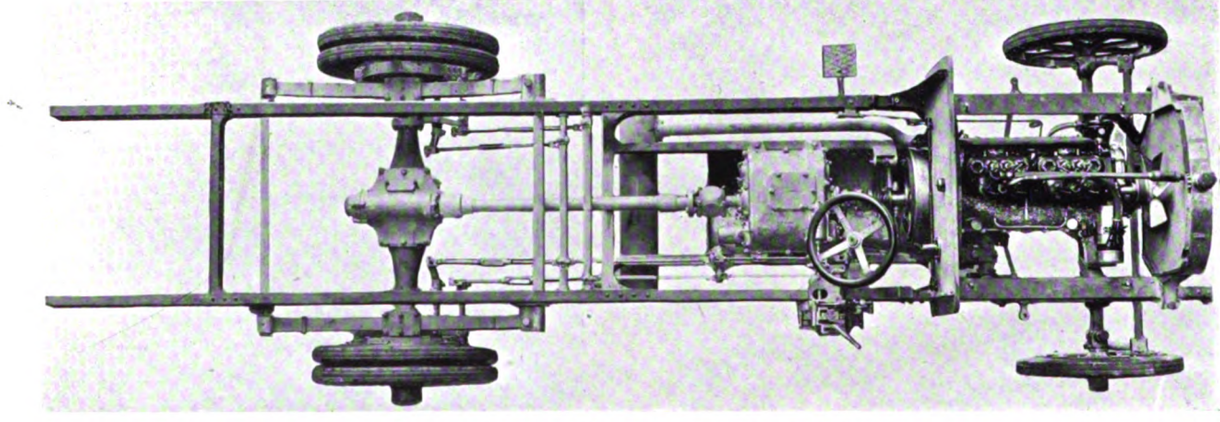

Fig. 2.—Plan of Tilling's 2-ton Model Chassis.

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an ounce are rejected. Stamped steel connecting rods, having white metal lined big-ends and phosphor bronze gudgeon pin bush, are used, and are all tested for both reciprocating and rotating balance on an Avery balancing machine. The crank shaft, constructed of chrome nickel steel, runs on three white metal lined bearings of ample size.

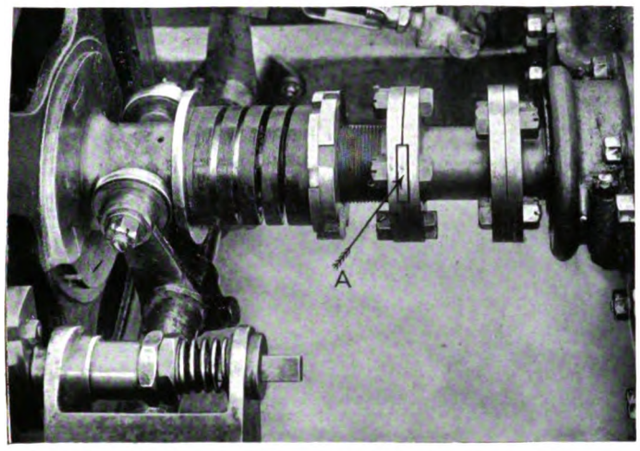


**Fig. 3.—Clutch Coupling**
(Showing key (A) through which the drive is taken).

The cam shaft, the cams of which are formed solid with the shaft, is also of chrome nickel steel, hardened and ground, the cams being ground on special machines to get the correct shape, every rotating and reciprocating part being balanced on special balancing machines. The oil pump is situated outside the engine, low down, and draws its supply from a large easily-detachable strainer, and delivers to pockets over the main bearings and troughs under the connecting rods, also to the timing gear case.

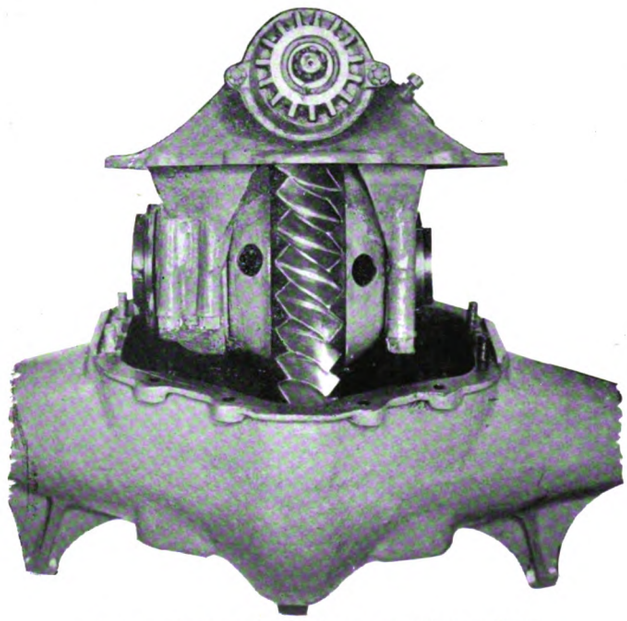

**Fig. 5.—Back Axle, Worm, and Worm Wheel**
(Showing Differential (raised) and Toothed Coupling to Propeller Shaft).

The "Solex" carburettor is fitted to both engines on the near side. This has a self-contained throttle, which is operated by a foot pedal only, the air being heated by the exhaust. Fixed ignition is employed, provision being made for the dual system, each cylinder being fitted with duplicate tappings for two sets of sparking plugs.

The "Megevet" type of radiator has been adopted. It is of large size, as indeed are all the water spaces, both in the cylinders and pipes. The method of mounting the radiator is of special interest, which is on the flexible principle. The anchor bracket on the off side of the radiator is provided with a shackle joint, the opposite bracket of which is bolted to the frame. This not only eliminates any straining action that may be set up, but also provides a means whereby the radiator may be swung over to one side upon removal of one bolt, thus leaving the front of the engine open for examination. The fan behind the radiator is

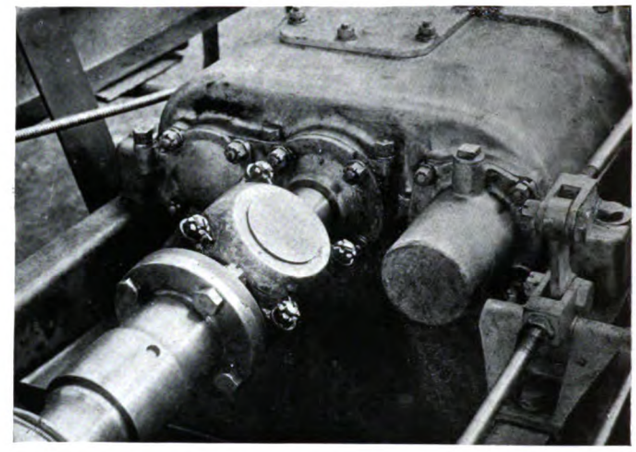

**Fig. 4.—Roller Bearing Universal Joint of Propeller Shaft.**

mounted upon an eccentric spindle, in order that belt adjustments can easily be made.

The transmission is through a leather-faced cone clutch of ample proportions. This clutch is so arranged that it can be dismantled when required without interfering with the gear box or engine. As

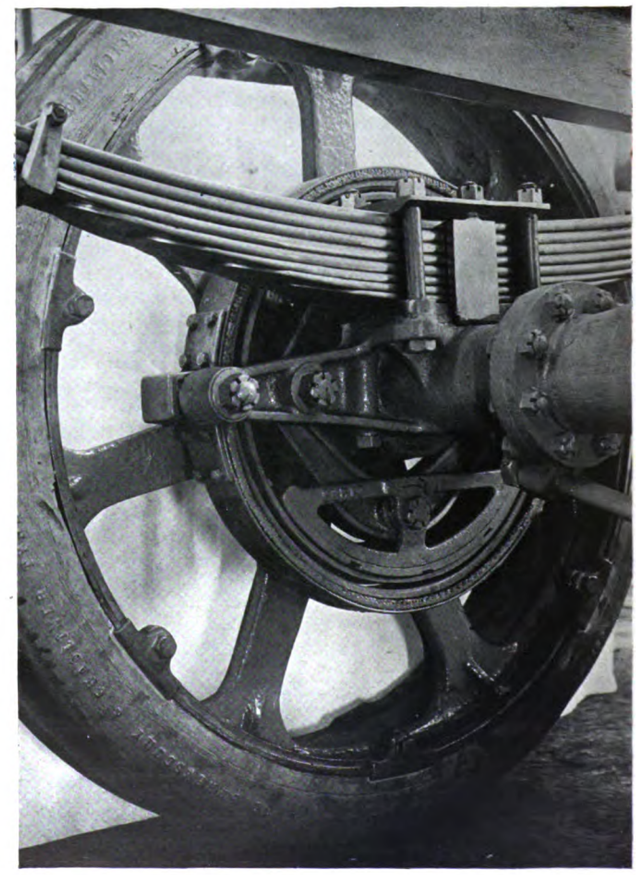

**Fig. 6.—Rear Road Wheel**
(Showing Separate Brake Drums).

will be seen by the illustration (Fig. 3), the clutch spring is easily adjustable by nuts, while the drive is taken through the key A and not through the bolts. This is clearly shown in the illustration.

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The clutch stop is adjustable without altering the initial tension on the spring. The engine is mounted upon two cross members, and the gear box on a sub-frame. On the 1-ton chassis the gear box is arranged to give three speeds, and on the 2-ton four speeds; in each case the direct drive is on the top speed, giving 18 miles per hour at the normal speed of 1,000 revolutions per minute. The shafts are short, and are

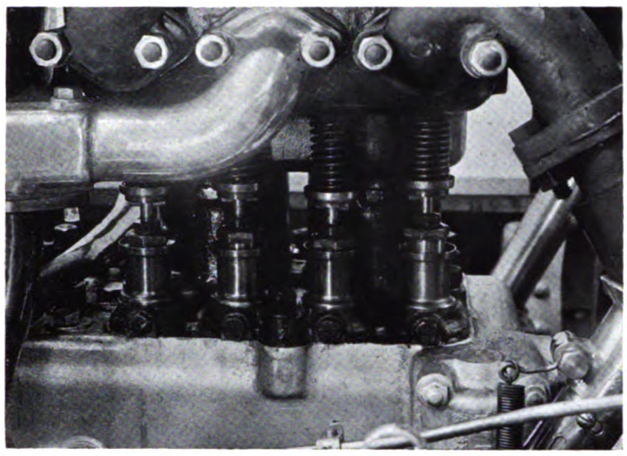

Fig. 7.—Rear View of Engine Showing Valves.

of chrome-nickel steel, with three ball bearings on each shaft. All the gears are of chrome-nickel, specially hardened and ground. The change speed lever has a free swing movement, and the shaft is entirely separate from the hand brake fulcrum bracket, so that it cannot bind when the brake is on. The drive between the gear box and rear axle is by tubular propeller shaft, having a roller bearing universal joint behind the gear box (Fig. 4), and has a sliding internal toothed joint at the front of the worm-driven axle. The final drive is by means of a worm

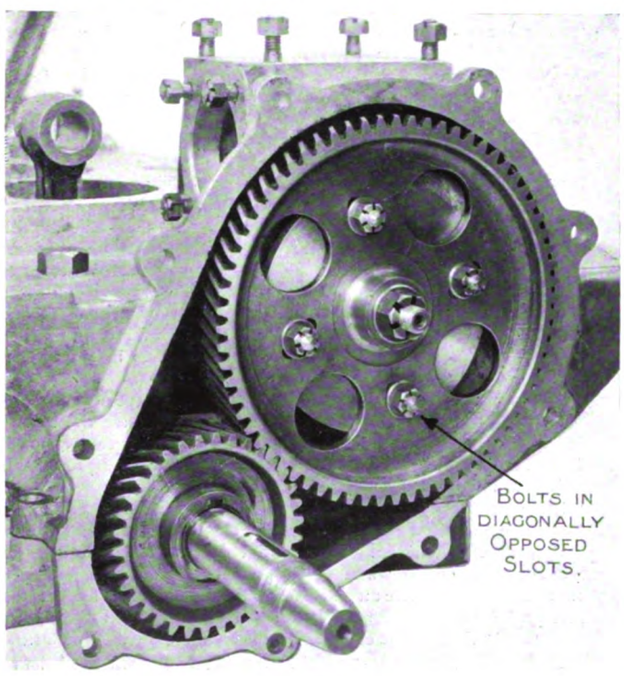


Fig. 8.—Timing Gear with Special Coupling to Cam Shaft.

and worm wheel arranged on the overhead principle. The worm is of chrome-nickel steel, case-hardened and ground, the worm wheel being of phosphor bronze. A mild steel casing forms a cover for the differential, and also encloses the worm gear.

No load is taken by the cross shafts, the whole being borne by the chrome-nickel steel tubes, which are machined from solid bars and run through spring and brake brackets into the cast-steel axle casing. The worm casing containing the overhead worm, worm wheel, and differential can all be withdrawn simply by undoing eight nuts and drawing the cross shafts (Fig. 5).

Special attention has been paid to the braking arrangements, which are on the dual system; separate drums are bolted directly to each of the rear road wheels, which have renewable wearing surfaces (Fig. 6). The internal expanding brake is operated by a foot pedal and the external contracting brake by hand lever, compensating gear being fitted to each. Cast-steel road wheels with floating phosphor bronze bushes are fitted to the front and rear of the 2-ton model, but in the 1-ton model "Timkin" roller bearings are fitted to the front wheels, and the phosphor bronze bushes to the rear wheels only. In both models chrome-nickel steel centres are forced by hydraulic pressure into the wheels and machined to a high degree of accuracy.

A number of other features, which are common to both models, are of special interest as showing that Messrs. Tilling as operators have found the necessity for making every part as simple and as accessible as possible. In the first place the whole of the valves, valve springs,

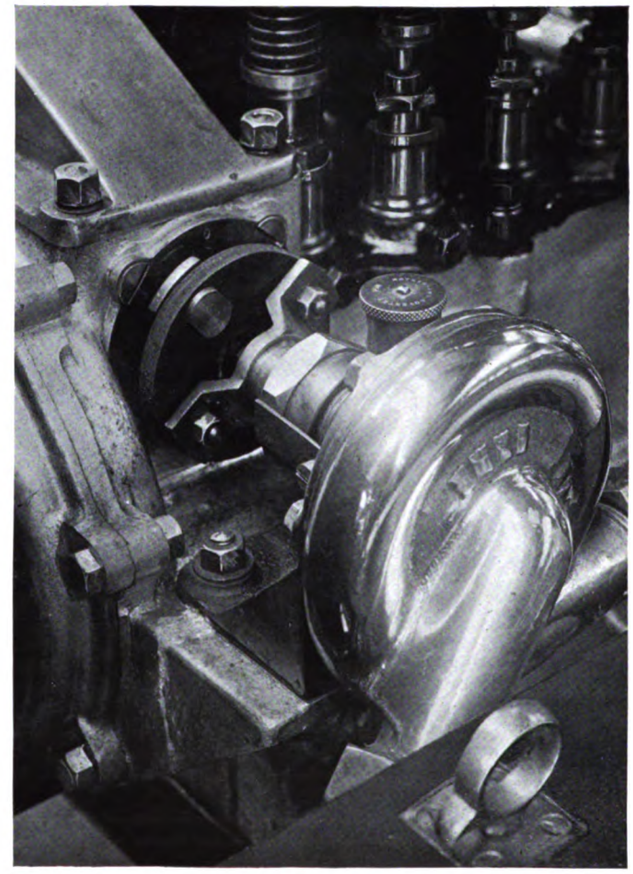

Fig. 9.—View Showing Leather Disc Coupling of Water Pump.

valve lifters, and valve lifter guides of the engine are in one unit, so that when the cylinders are lifted at any time the whole of these parts come away together, and every part is open for inspection and adjustment whilst on the bench (Fig. 7). The valve lifters are hardened and ground to fine limits, and, owing to their large diameter, wear is a negligible quantity.

One of the most important parts of any engine is the timing gear, and it will be agreed that in the case of the Tilling machines simplicity in design, combined with the best of materials and workmanship, make their timing gear equal to any on the market. The width and angle of the teeth give a smooth silky drive, and the ease with which the engine may be timed is due to the special form of coupling between cam shaft wheel and cam shaft. This coupling consists of a flange on the end of the cam shaft having four diagonal slots (Fig. 8); the cam shaft wheel, which is spigoted on to cam shaft, also has four diagonal slots, but in an opposite direction. It follows therefore that if the diameter of the pitch circle of bolts which hold these two parts together is increased or decreased the cam shaft is rotated slightly in an anticlockwise or

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clockwise direction. This adjustment, being made while the gears are in mesh, obviates the tedious method of pulling the wheel out of mesh, advancing or retarding one or more teeth as the case may be, and then putting into mesh again and trying the engine for timing. The water pump and magneto coupling is extremely simple, and consists of a leather disc which is absolutely silent and at the same time perfectly effective (Fig. 9).

Every detail in these chassis has received close attention. Thus each of the push and pull rods are fitted with spring ball and socket prints, while the wearing surfaces are hardened, and each lever is bushed with a hardened steel bush, and every pin is hardened. Messrs. Tilling have produced a chassis well worthy of their high reputation, and it is not surprising that the demand for both the 1 and 2-ton models has already outrun their expectations.

## INSTITUTION OF AUTOMOBILE ENGINEERS.

### Dr. Ormandy on Mixed Fuels.

The second meeting of the present session of the Institution of Automobile Engineers was held on November 12 at the Institution of Mechanical Engineers, Storey's Gate, S.W., when Dr. W. R. Ormandy read a paper entitled "Some Experiments with Mixed Fuels, with Special Reference to Alcohol Mixtures." The paper was an interesting description of tests made for the *Autocar* by the author, who advanced the following main conclusions to be drawn from the experiments:

(1) That an ordinary modern petrol engine will run on a half and half mixture of benzol and alcohol, and give just as much excellence in its more important working qualities as when running on petrol. (2) That variation of compression has a much greater influence on the success of alcohol than has hitherto been suspected, and this points to he necessity for scientific investigation on carburation with a view to more perfect gasification and reduction of throttling. (3) That progress towards the final goal of using alcohol virtually as a sole fuel is best sought by experimenting on mixtures containing gradually diminishing amounts of benzol, and that all the known data, properly attested, point to the fact that it is only a question of intelligent research to reduce the amount of benzol to a negligible quantity in proportion to the alcohol. Dr. Ormandy expressed gratification that the Imperial Motor Transport Conference had emphasised the necessity of pioneer work not only with a view to investigating the raw materials and the cost of production of alcohol throughout the Empire, but also in regard to the need for scientific and technical investigations in the direction of its correct use.

In the course of the discussion Mr. W. A. Hall remarked that much had been heard of the fact that alcohol had been produced at 6d. per gallon, and he was mystified as to why, if this was so, it was not done on the largest possible scale, having in mind the enormous demand for it.

Mr. A. E. von Groeling mentioned that a plan being tried at present was to mix Roumanian and American paraffin oil and treat it chemically, and by this means a tremendous percentage of petrol could be obtained.

Lord Montagu asked why the use of alcohol for internal combustion engines had not progressed to any considerable extent in Germany, where the Government gave a bonus to the production of alcohol from potatoes.

Mr. Horace Wyatt described the steps which the Imperial Motor Transport Committee were about to take in the matter of fuel research work, and spoke of the need for subscriptions.

Dr. Ormandy, replying, said he was sending off a quotation for a plant to British Nyasaland, to make 600 gallons of alcohol from maize, costing 16s. to 19s. a ton, according to the season. This would be 95 per cent. alcohol, and the actual cost would be 3d. per gallon. In Germany the use of alcohol was being somewhat restricted owing to a re-arrangement of the fiscal and agrarian policy of the Government, which had resulted in their refusing to do as they had done in the past, viz., sell alcohol at less than cost price with the view of developing districts from the agricultural point of view, which would otherwise not be able to maintain themselves.

### Summer Meeting in Belgium.

The council of the Institution have decided that the summer visit for 1914 should be paid to Belgium. It is probable that Brussels will be selected as the head-quarters, and excursions will be arranged from there to visit one or two motor car factories, steel works, stamping works, and works of makers of motor car parts.

A party of 24 of the graduates of the Institution accompanied by the president, paid a visit on November 22 to the works of Vauxhall Motors, Limited, at Luton. They were received by Mr. L. H. Pomeroy. One interesting fact came out in the course of a visit to the testing shops, Mr. Pomeroy informing the graduates that every engine sent out had first to be submitted to a test of half an hour's duration at 1,250 revolutions per minute.

Other papers to be read before the Institution this session will include two dealing with commercial vehicles. Tickets of admission to any lecture can be obtained on application to the Secretary, 13, Queen Anne's Gate, S.W.

## AUXILIARY TO NORWICH TRAMWAYS.

### Mr. T. W. Ketley Explains the Omnibus Scheme.

Norwich Electric Tramways Company are applying for Parliamentary powers to construct six new tramways and two doublings, and two deviations of existing lines. Further, they ask for sanction to run motor omnibuses and vans. Mr. T. W. Ketley, the general manager and engineer, has contributed to a local journal an article dealing with the motor traction portion of the bill, and in the course thereof he writes: "In Norwich take the case of St. Giles. Tramcars, each with a carrying capacity of 52 passengers, pass to and fro 34 times per hour during the working day. Granted the cars are bulky, but try and accommodate their possible 1,768 passengers per hour by means of any other vehicle, and it will be evident that this narrow street has not the necessary space to permit of it. Again, compare the room taken up in a street by a tramcar carrying 52 passengers, and a private motor car carrying four, or a carriage and pair carrying, say six, what a disproportion is seen! And yet one hears complaints that tramcars congest the streets! And this brings us to the consideration of the motor omnibus as a solution of the urban passenger traffic problem.

"The motor omnibus is usually designed to carry 34 passengers, as against 52 for a car. It is evident that more omnibuses than cars would be needed to deal with a given number of passengers. As an example (to refer again to St. Giles), to deal with 1,768 passengers we should need 52 omnibuses per hour as against 34 cars per hour, so obviously the omnibus would congest the streets even more than the cars do, and as omnibuses would have to travel more slowly than cars on the Guildhall Hill (because of their tendency to skid), the congestion would be even worse than shown by the above figures.

"But this is not the worst case against the motor omnibus when considered as a substitute for tramcars; the expense of running them for traffic such as Norwich provides is prohibitive. The running cost per mile of a motor omnibus differs locally, and not much reliable information is available. At a recent Municipal Tramways Congress where the subject of tramcar *v.* motor omnibuses was exhaustively debated, the cost of working a motor omnibus per 'bus mile was taken as 10d: this was held to be a fair figure. Personally, I think it is on the high side, and for our present purpose, we will put it at 9½d.

"Now, last year the Norwich cars ran 11,032,325 car-miles, and the average earnings over the last four years are only 8·19 pence per car-mile, and we have seen that we need, roughly, one-third more omnibuses to accommodate the passenger traffic if we provide the same accommodation and time schedule. So that this mileage must be increased by one-third if we substitute omnibuses for cars, making a total of 1,377,100 omnibus-miles, but as the earnings in Norwich are only 8·19 pence per tramcar-mile, and the omnibus costs 9·50 pence per mile to run, we should have a loss of 1·31 pence per omnibus mile when compared with present receipts. So that to give the Norwich citizens their present accommodation a loss of 1·3 pence per omnibus mile would result, and the total loss in a year on the present time schedule would amount to £7,516.

"It is regrettable that the motor omnibus has been dragged into the field as a competitor with the electric tramcar; on equal terms it cannot compete for long. There are localities which can be best served, or say adequately served, by omnibuses, and there one would without hesitation advise an omnibus service. But when the passenger traffic problem of a large manufacturing city is in case, there is, at the moment, only the electric car which can economically deal with it.

"The motor omnibus is so good in itself and so much needed in its proper sphere, that there was no need to clamour for its universal use. For suburban traffic it is excellent, and may soon be indispensable, but it never has and never can live on the tramcar fare basis; that is clearly demonstrated by the above figures.

"In Norwich we propose to give the motor omnibus its proper sphere, to use it as an auxiliary. Its functions will be to take care of super-traffic, to link up Norwich and outlying places—in fact, to be a free-lance, an extra mobile arm. And, when used in this way, Norwich will have a mixed system of tramcar and motor omnibus catering economically for it, whether the citizen be at work or play."

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# MOTOR TRAFFIC.

## OMNIBUSES OR RAILLESS CARS?

A Debate by Experts at Reading.

At a meeting of the Reading Chamber of Commerce in November the proposals of the Town Council to obtain powers for running railless trolley cars and motor omnibuses were discussed under the presidency of Mr. E. W. Ridley.

Mr. J. R. Dick, B.Sc., was the chief advocate of the railless trolley car, which, he said, could be steered as freely as the petrol type of vehicle. It was suitable for cross-country journeys to conections, or for extension at the ends of existing tramways into the less populous districts. The capital required per route-mile for electric cars with rails and permanent way was £10,000 to £14,000, and overhead equipment for trolley cars £1,000 to £1,200 per mile. Unless petrol omnibuses had very great financial advantages they would be undesirable, because they would interfere with the uniformity of the working of a tramway system. The electric method of power application was much more suitable for every-day use and heavy gradients than petrol engines. The vehicles were less subject to vibration and shocks, and were, therefore, more comfortable, and there was no skidding or undue wear on the roads or tyres. Speed adjustment with electricity was very easy, whereas with petrol engines it required expensive mechanism of clutches and change gear. Where a centralised production of electric power was possible, this system was undoubtedly superior to petrol omnibuses, each with its own engine. Electric omnibuses had very much less noise and no smell. Motor omnibuses might be useful in testing the traffic conditions on the routes to be run finally with trolley vehicles. The capital expenditure would be in the ratio of £700 to £750 for electric vehicles, and £750 to £850 for petrol omnibuses. The Local Government Board would only allow five years as the repayment period for petrol, as against 10 years for electric omnibuses. The overhead equipment could be taken up and reinstated on a new route without serious cost. In Reading the cost for current would not exceed ·8d. per mile, and this figure was not subject to such fluctuations as with petrol. Renewals of rubber tyres on electric vehicles was much less than on petrol vehicles on account of the smoothness of running. Insurance charges were much heavier with petrol, due to fire risks and accidents. A safe financial comparison of the two alternatives would be 7d. per mile for electric and 10d. for petrol. Some municipalities had been running petrol omnibuses at a cost ranging from 1s. to 1s. 3d. per mile, whereas with electric vehicles the tramcar total cost was just under 8d. per mile. The London General Omnibus figures for London had no real bearing on the working of a small system in a provincial town. The experience at Keighley, where the Corporation ran petrol omnibuses for four years and this year changed to trolley omnibuses, showed a cost of 1s. 3d. for the former as against 6½d. for the latter. The engineer estimated the wear of tyres and the road surface at the ratio of three to one in favour of electric vehicles. The trackless car was already well established in this country. Services were in operation at Leeds, Bradford, Dundee, Rotherham, Ramsbottom, Stockport, Keighley, and Aberdare, and other services were projected. In Reading the routes for further traffic development could be decided upon without much room for error.

### Petrol Traction "Cheaper than Bradford Railless?"

Mr. Horace Wyatt, editor of *Motor Traction*, maintained that many of the points made by Mr. Dick were applicable to the trackless trolley system—for instance, the way in which the cars would link up with existing tramways. In the event of Reading adopting single-deck trolley cars for all the routes, merely because a certain number of residents on some routes disliked double deckers, it would be bad policy. The double-deck vehicle, carrying 36 passengers, could be operated at a cost indistinguishable from that of the single-deck car carrying 28 passengers. Comparing double-deck vehicles in each case, the petrol motor omnibus had a great advantage over the trolley car. There would be very considerable difficulty in adapting the railless trolley system to double-deck cars on account of the height of the wires, and in order to keep the connections to the wires clear of the passengers on the upper deck. The trackless trolley system must necessarily cost more in the first instance than the motor omnibus. The cost of the overhead gearing and line was about £1,000 or £1,200 per mile. It was a surprise to him to hear the cost of electricity estimated at ·8d., because at Bradford the cost of electricity during the first year's working of the system came out at 1·22d., practically 1¼d. It would be fair to put the present price of petrol at 1s. 2d. per gallon. Nine miles to the gallon was a perfectly reasonable calculation, and that worked out as a cost of 1·5d. a mile. That was about a farthing less than the Bradford trolley car, and it referred to a 34-seated omnibus compared with a 28-seated car. They might leave the tyre question out, because it was customary not to buy tyres outright, but on a mileage guarantee, and manufacturers would not give a higher guarantee for the trolley omnibus than for the motor omnibus of modern construction Keighley had experimented with omnibuses for over five years. Therefore those vehicles were incomparable with modern motor omnibuses. As regards the cost of tyres, there was the petrol-electric omnibus. It would be absurd to say that it cost four times as much in road repair and tyres to run a petrol-electric omnibus as a trolley car. The London General Omnibus Company's figure for motor omnibuses was something under 7½d. a mile two years ago, and it was reported to have gone lower. The figure for Tillings, with a much smaller fleet, and allowing for petrol at its highest, was just over 7½d. a mile, and that figure, he was told, applied also to the service running in Birmingham. In London the average of stoppages of omnibuses was 12 per 100 000 miles covered, and the average time which the vehicle was kept out of duty owing to a stoppage was a little over an hour. These stoppages included not only mechanical breakdowns, but also any form of accident. The figures for the running of mail contracts by London firms showed about the same average of mechanical derangement—an almost infinitesimal one. The modern type of omnibus had very little tendency to skid. If petrol cost a little more at present than electricity, it did not necessarily imply that the petrol omnibus would cost more to operate than the trackless car, because the trackless system cost more initially. Whatever the regulations as to periods of loans might be, it was absurd to put the life of a modern omnibus at five years. The earning capacity of the motor omnibus was higher. One reason was that it could be used on many routes, and it would pay, because the upper deck would be filled on a good many days, especially if the 'buses were used for country trips. In Reading, omnibuses used on a holiday service to Ascot and to Henley would make a lot of money, and on Sunday trips could be run to the country. The difficulty of road repair and maintenance was the biggest argument against the trolley car. There were so few trolley cars running that it was difficult to say for certain if the trolley car would be a little cheaper to run, while the motor omnibus could be used on any routes to test and develop them, and if superseded could be withdrawn at a minimum cost.

### Opinions of the Chairman of the Tramways Committee.

In the course of the discussion Mr. W. Clayton said the mobility of the motor omnibus was a tremendous advantage, and it would not detract from the beauty of the town.

Alderman Cox contended that it was shown at the Municipal Tramways Conference that the London General Omnibus Company in 1912 put their running cost at 9⅜d., at Keighley it was 1s. 3d., Halifax 1s. 0⅜d., and Eastbourne 1s. 2¼d. The Corporation already had the motive power for trolley cars, and the more power they produced the cheaper it was.

Mr. S. H Hodgkin was surprised that practically nothing had been said about petrol-electric cars.

The Mayor (Alderman C. G. Field), who is chairman of the Tramways Committee, said he was surprised to hear that motor omnibuses could be run for 7½d. a mile. Tenpence was an unquestioned figure. Motor omnibuses were more liable to skid than trolley cars, which were lighter and much neater. He hoped that in Reading they would see no trolley arms whatever. What they had seen experimentally at the West Ham Conference of the Municipal Tramways Association, and the system of running in Vienna, was infinitely superior. There was practically no danger from a breaking of the wire, because the power was automatically shut off. The electric brake was not the brake that was usually applied on the existing cars, and he took it that it would not be the brake usually used on the trolley cars. The reason single-deck cars were proposed was simply on account of the low railway bridges. There was no reason why there should not be double-decks. It was an absolute fallacy to say that trolley cars would have to stop while passengers were boarding a car in front. They would have to stop if there was a trolley arm, but he did not think there was any likelihood of seeing the arm in Reading. They had ample surplus power for running trolley cars. He was not opposed to motor omnibuses as such, but he was of opinion that for economy and for easy travelling trackless cars were infinitely superior. As for scrapping, if they scrapped them in three years the Corporation would save more by scrapping trackless cars than by scrapping motor omnibuses.

Motor Owners' Petrol Combine.—An oil refinery is being erected at Thames Haven by the Motor Owners' Petrol Combine, in order to supply motorists with petrol from a source independent of any trust.



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# MOTOR TRAFFIC.

## EDISON ACCUMULATORS FOR TRACTION WORK.

There is now a prospect of a substantial advance being made in this country in the use of the Edison accumulator for automobile road vehicles of various classes. On November 27 the new premises of Edison Accumulators, Limited, situated at 2 and 3, Duke Street, Piccadilly, London, were formally inaugurated. A large company of invited guests inspected the fine new building which has been erected, and made an examination of a number of motor cars fitted with Edison batteries and electric drive. Subsequently the guests were entertained to luncheon, Lord Montagu of Beaulieu, chairman of the company, presiding.

The company, after a preliminary period of organisation are now, we understand, in a position to supply various classes of electric vehicles, both for pleasure and industrial purposes. The Edison battery, in the meantime, will not be manufactured in this country, but will be imported from America. The vehicles themselves will, of course, be produced by various well-known British firms. Special attention, it is believed, will be devoted to industrial vehicles. The extraordinary durability and low cost of maintenance of the Edison storage battery, in which steel and nickel take the place of lead, are now well known.

Mr. W. R. Cooper, after luncheon, proposed the toast of prosperity to the Edison Accumulator Company. He said that this was the opening of a new era. It was the reincarnation of the electric vehicle in this country. The Edison cell suffered, perhaps, because it had a celebrated father. It had to live past the failures of previous cells, and it had also to live up to the reputation of Mr. Edison. The American reporters had succeeded in placing a halo of sensationalism around the Edison cell, which in some way made the position difficult. He wanted to emphasise the fact that the Edison cell was nothing sensational. Everyone knew that the reason why the electric vehicle failed in the past was that the lead accumulator required to be treated in a careful way, and in working it was impossible to give the necessary care to it. It was not necessary to decry the lead accumulator; there was ample field for both. But the fact that the lead accumulator failed in the past had left a certain scepticism behind, and the Edison cell had to live down that scepticism. When the Edison cell first came to this country he was sceptical about it himself, and it was only when he came into experimental contact with it that he came to the conclusion that the cell was worthy of its reputation. There were certain strong points about it, among which was the fact that it was made of steel instead of lead, and therefore must be stronger. Then it might be left in a discharged condition without injury resulting, which was impossible with the ordinary lead cell. It could be charged at a very high rate without doing any harm. That meant a material saving in time. In addition, it had a long life. These were decided virtues. He did not doubt that from this time forward the electric vehicle would make considerable progress. He thought the lead cell might take a part in that progress, but whatever part it did take it would be largely due to the opening made by the Edison battery. There were now 37,000 electric vehicles in the United States. A year ago there were only 20 makers of them in the United States, while now there were 37. Why should we not make similar progress over here? There were four parties to be considered in this country. First there was the general public, who would gain very materially by the spread of the use of the electric vehicle, especially in London. The second party was the buyer. The buyer held the purse, and if they did not give him what he wanted he would not pay for it. If they gave him the electric vehicle, they gave him something which he did want. The important point was that the electric vehicle was easy to manipulate. In the case of a small trader with two or three vans, it was rather a large question to go into the petrol vehicle, which required expert men, but if he got the electric vehicle he could use the men he had at present. It was only a question of handling the steering wheel, and that a man could master in a very short time. Then the cost of petrol was going up, and on the other hand the price of electrical energy was continually going down. The third party was the manufacturer. From that point of view the Edison battery was all right. The fourth party was the electric station engineer, who was going to supply the electric energy. If he did not supply it at a figure which would suit the buyer the electric vehicle was going to be of no use. In comparision with a few years ago, however, the position was entirely changed. Electric energy could be obtained at a penny, or even a halfpenny per unit. From the point of view of the central station man the electric vehicle load was not one to be despised. More apparatus would be sold, and more demands would come on the central station. Therefore, he would ask all parties concerned to pull together in this extremely important movement, the development of the electric vehicle. He had no doubt that if they did pull together there would be a very great development in the next few years.

Lord Montagu of Beaulieu, in responding, said that he was not prepared to make any extravagant claims for the Edison battery. He was quite sure it was good enough in itself to convert all those who used it to a favourable opinion of its merits. At the same time he would certainly not have had his name connected with this enterprise, nor would he have become chairman of the Edison Accumulator Company unless he had been convinced that the prospects of success were favourable, that the article was a genuine one, and that it had its chances to make good its claim to the public. When he was in the United States last year and visited Mr. Edison, nothing struck him more than the very large use of electric vehicles all over the States. Wherever he went he saw them used for certain specified purposes. Nobody would claim that the most perfect electric car fitted with the most perfect battery could take the place of the most perfect petrol car, but there was an enormous field for the electric vehicle where the petrol car was not being used. There was the electric runabout used by ladies in towns. It was a wonderfully useful vehicle for anybody who could not afford to keep a chauffeur, and was content with a speed up to 20 miles an hour. He had also seen the electric vehicle being used for the purpose of conveying heavy goods. He saw lorries working near docks in New York. He saw them working in the streets of Chicago, taking all sorts of produce for subsequent carriage by water or rail. There were 5-ton lorries and things of that sort. The merchants assured him that the goods could not be conveyed at such a cheap rate by any other means with which they were acquainted. These facts had converted him to the opinion that there was a field for the electric vehicle in this country. For runabout work in towns and for lorry work and light van work the electric vehicle had a very great future. Nothing would help to develop it more than the very reasonable charges lately made by the companies producing electric power. In some tests which were made last year by the Automobile Club with a vehicle which had a total weight, including battery and load, of 1·85 tons the watt-hours per ton-mile worked out at 3·32, the average speed per hour was 11·52 miles, and the efficiency of the battery was 60 per cent. The power was obtained at a halfpenny per unit, or ·167d. per ton-mile, or ¼d. per car-mile. In actual practice it would cost with a highly efficient petrol engine ½d. per car-mile, while the cost with the Edison battery was ¼d. He thought that the electrical vehicle was going to work out more cheaply for power than any other vehicle on the road.

Mr. Bernard Drake, who also replied, said that they had a considerable amount of prejudice to live down. He had been connected with electric propulsion since the earliest days. He thought that he built the first electric launch that was ever seen. Then he had helped to build tramcars, and drove the first one that was ever seen in Berlin. The first electric car seen in the streets of Berlin was an English-made one. He was at present manager of a lead accumulator company, and therefore his interests were somewhat divided, but he thought there was room for both. He was in America last May and was very much struck by the enormous number of accumulator cars. He interviewed some of those who were running them simply on the score of dollars. A brewery man told him that his firm had gone into the matter and had discarded the whole of their horses and gone in for electric trucks entirely. They had been running with the Edison accumulator for two years. When asked about depreciation, this gentleman said that he cared nothing about that, as in two years he wiped off the lot in his savings. Wherever he (Mr. Drake) made inquiries he was told that those who had tried the electric delivery van were quite convinced that it was the cheapest mode of moving a ton a mile. He was assured that in the case of 5-ton trucks 2½d. per car-mile covered the whole expense of running, including interest and depreciation. That was considerably lower than could be obtained with horses, or with petrol. A unit of electricity gave a horse-power for an hour. They required a pint of petrol to give about the same. Therefore, it lay with the electric supply companies to fix such a price for the charging current as would enable the electric vehicle to be a commercial success He was told in America that up to a year ago about one-third of the vehicle batteries in use were Edison, and two-thirds lead. Last year the proportions were half and half, and in the future it was expected that the lead battery would disappear, and that the Edison battery would have the field to itself. It was such statements that had induced him to come on the board of this company, and he felt sure that if the price of electricity was reduced to ½d., which the supply companies could afford to do, there would be a large load for the supply companies, who would be able to utilise their plant at night, and commercial electric vehicles would be as common before many years were over as taxicabs were now.

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# MOTOR TRAFFIC.

Mr. SEABROOK, of the Marylebone electricity department, spoke of the improvement of the electric vehicle from the point of view of public health, and said that in Berlin petrol cabs would not be licensed now owing to the fumes which they produced.

Mr. ENGCUMBE, of the Kingston-on-Thames electricity department, said that the difficulty all along had been to get the batteries to stand the stress of traction work. He was sure they were satisfied that the Edison battery possessed those advantages of construction that would enable it to withstand that wear and tear. The question of the price at which electricity could be supplied was a very vital one, and one which he thought central station engineers could to a very large extent arrange with users of battery cars. The power-station engineers had, if possible, to show a balance on the right side, and though they would do their best he was not prepared to say that as a body they could get the price as low as ½d per unit. Possibly the figure might be between a ½d. and a 1d. The question of electrical vehicles was receiving close attention from the central station point of view. He had presided at a meeting at Kingston of about 400 engineers, where an excellent paper on electrical vehicles by two members of the staff of the Edison Accumulator Company was discussed. It had been a great surprise to the station engineers there to find what had been done in the matter in America, and it showed them that what had been done on the other side of the Atlantic could be done here. They saw that a new era had arisen, greatly due to the advent of the new battery. The result of that meeting was that the power-station engineers' association had formed an electric vehicle committee, and they had co-opted representatives from those interested in electrical vehicles and the supply of electricity. He had great hopes that the outcome would be the furtherance of the interests of the electrical trade generally.

## STRAKER-SQUIRE (1913), LIMITED.

Subscriptions were invited between November 25 and 28 for 75,000 shares of £1 each at par in the above company, which has been formed for the purpose (*inter alia*) of acquiring from June 30, 1913, as a going concern the business of Sidney Straker and Squire, Limited, the well-known manufacturers and traders of motor cars, motor vans, motor lorries, motor omnibuses, etc., and for the other purposes mentioned in the memorandum of association. Formed in 1901, Sidney Straker and Squire, Limited, have been successful in founding a sound and lucrative business, and the promoters state that the time has now arrived when the excellence of their work has stimulated orders to such an extent that they have quite outgrown the limits of their present capital, and an increase of the latter is essential to keep pace with the growing demands made upon their resources.

The particulars given as to the vendor company's heavy motor vehicle productions are of interest. The company was a pioneer of the industrial vehicle. Upwards of 1,000 commercial vehicles have been supplied to business firms in various countries, while Straker-Squire public service cars have been supplied to the number of 544 chassis for running in the following towns: London, Brighton, Cambridge, Gateshead, Bath, Ramsgate, Peterborough, Worthing, Newport, Birchington, Margate, Farningham, Yarmouth, Auckland, N.Z., Pretoria, S.A., Cairo.

Eighteen 4-ton lorries have been supplied to Arthur Guinness, Son, and Company, Limited, of Dublin; also to numerous other brewers, including Ind, Coope, and Company, Limited, D'Arcy and Company, Watkins, Pim, and Company, Wilkins Brothers, and Hudson, Limited, etc.

Ambulances, lorries, and other types of vans have been supplied to the War Office, the Admiralty, H.M. Gunpowder Factory, the Crown Agents, the Army Service Corps, foreign government departments, municipalities, etc. The Great Western Railway Company have in use and on order no less than 60 Straker-Squire delivery vans. Motor vans have also been supplied to the Midland Railway Company, the North Eastern Railway Company, the Great North of Scotland Railway Company, and foreign and colonial railway companies.

In addition to carrying on the works at Nelson Square, London, S.E., and the showroom, workshops, and offices for private cars at Shaftesbury Avenue, W.C., the company's cars of standard types are also to continue to be manufactured by Brazil, Straker, and Company, Limited, who have erected a new and up-to-date factory at Fishponds, Bristol. Messrs. S. Straker and L. R. Squire, the founders of the vendor company, are continuing their services as joint managing directors for a period of five years, with the option to the company to renew the agreement for a similar period. The vendors have agreed to sell the undertaking to the company for the sum of £55,000, payable as to £30,000 in cash, and as to £25,000 by shares. The profits for the past three years, after allowing for depreciations, but not including directors' fees, income tax and interest, are given as £9,656, £11,615, and £13,086, showing 20 per cent. on the purchase consideration of £55,000. The vendors estimate that the profit for the twelve months following the incorporation of the company will exceed £18,000.

## PETROL-ELECTRIC OMNIBUSES FOR EDINBURGH.

By a majority of one vote Edinburgh City Council have adopted a report presented by the Tramways Committee, recommending that tenders be obtained for three single-deck and three double deck petrol-electric omnibuses, in order to run a circular four-mile service from West Meadows, foot of Marchmont Road, eastwards to Hope Park, Preston Street, Dalkeith Road to Cameron Bank, Lady Road, Esslemont Road, West Mains Road, Blackford Avenue, Kilgraston Road to starting point on West Meadows. The Tramways Company have undertaken to work the vehicles, and to link them up with the tramways by means of transfer tickets. When the matter was before the committee it was agreed to by 16 votes to 12, and Councillor Harrison, who moved the proposal, estimated the cost of the vehicles at £5,100. The garage would cost £1,500. They had had, he said, various estimates with regard to the loss they would incur. Personally he did not believe the loss would be so great as their financial advisers stated. It was something worth risking a little money for, and it was a necessity for the city to make a forward step in this matter. At the meeting of the Corporation, Bailie Rusk said that if the Council did not undertake the project somebody else would, and then they would have to buy them out.

## OMNIBUSES OFFERED TO OXFORD.

Oxford Corporation have rejected, by 27 votes to 25, the proposal of the Tramways Committee in favour of accepting the National Electric Construction Company's scheme for running petrol-electric tramcars in the chief thoroughfares, and overhead trolley cars and motor omnibuses for other routes. The Council have decided to inform the company that the Corporation relied on existing rights as defined in several Acts of Parliament affecting the parties. An amendment to instruct the city solicitor to issue a writ forthwith for the recovery of the liquidated damages was defeated. Several members advocated the use of motor omnibuses, and two colleges sent letters in support of that idea, but it was stated that this course could not be followed unless the horse tramways were purchased at a cost of £28,000. Alderman Carter mentioned that he had received several offers from omnibus companies to come to the city.

Subsequently the National Electric Construction Company made an offer to drop the tramway electrification proposals, and to substitute a motor omnibus service, paying the Corporation £500 a year as rent. In return they asked the Council to pay £20,000 for the existing horse tramways, excluding horses, cars, etc., the rails to be taken up. The Tramways Committee recommended the acceptance of the offer, provided the company paid £800 a year rent, the sum payable by the Corporation to be reduced to £15,000. The General Purposes Committee have decided against the recommendation.

The City of Oxford Electric Tramways Company have since notified that they are applying for Parliamentary powers to enable them to run omnibuses, to pull up the tramway lines, and to enable the Corporation to purchase the horse tramways.

Mr. W. R. Morris, the owner of a local garage, has applied to the Watch Committee for licences to run two Daimler omnibuses.

## DENNIS BROTHERS (1913), LIMITED.

The first annual general meeting of this company was held on November 20, at the Cannon Street Hotel, E.C., Mr. G. Clare presiding. The report stated that for the year to September 30 the net profits were £43,249, from which must be deducted net earnings to March 31, 1913, which, in accordance with purchase contract, were paid over to vendor company, £20,754, leaving £22,495. The directors recommended payment of dividend at rate of 1s. per share, equivalent to 10 per cent. per annum, from March 31, 1913, to September 30, 1913, £15,000; and to place to reduction of preliminary expenses and underwriting commission, £5,000, leaving £2,495, carried forward.

In moving the adoption of the report, the chairman said the anticipated profit, as set forth in the prospectus, based on the letter addressed to the directors by Messrs. Dennis (the joint managing directors of the vendor company), was over £50,000. The result of the year's working had not belied that forecast. The year's operations had yielded a net profit of £43,249, but if the directors' fees of £1,062, and the salary and commission of £6,805 payable to Messrs. Dennis were added, it would make a total of £51,116. This result was two-thirds as large again as the average profit of the three preceding years, and was also greater than the profits earned in 1910 and 1911 put together. The commercial vehicle branch of the motor trade as yet had only crossed the outer fringe of the possible market. What had taken place with regard to the transport of passenger traffic in the great cities of the world was rapidly taking place in regard to the transport of merchandise, and the directors viewed the outlook with confidence. As to competition, they were probably as well equipped for self-defence as any firm in Europe.

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# MOTOR TRAFFIC.

## LONDON MOTOR FIRE VEHICLES.

In the course of a paper read at the International Association of Fire Engineers, recently held at New York, by Mr. A. R. Dyer, A.M.I.C.E., of the London Fire Brigade, the author gave an interesting account of the various motor vehicles and appliances in use in the Brigade. Mr. Dyer said that perhaps the most successful type of appliance to be introduced has been the electric motor escape van, for service in localities where only moderate gradients are encountered, the first vehicle of this kind being obtained in 1911. The power is provided by a battery of 84 cells of 195 ampere hours' capacity, giving a normal running output of about 30 H.P.

The appliance runs about 30 miles on one charge if necessary, but owing to the nature of its service it stands fully charged ready to give out the maximum output on receipt of a call. The motors are in the front wheels, the fields being fixed to the stub axle, around which the armature revolves with the wheels. The tyres are single 5 in. on all wheels. There are electric brakes on the front wheel motors, which are valuable in emergencies, whilst two mechanical brakes on the rear wheels are sufficient under ordinary circumstances. The control is of the series-parallel type, with five notches forward and reverse, and two brake positions.

The weight of the appliance ready for running, but without ladders, hose, and small gear and men, does not exceed 8,300 lb., the total weight of the machine complete being about 11,800 lb. A speed of 25 miles per hour is maintained with full load on a level and good road, and the machine is capable of ascending a gradient of one in eight, fully laden, at a speed of about six miles per hour, or a moderate gradient at 15 miles per hour. The weight of the appliance fully laden is about 600 lb. more than a corresponding petrol van.

Undoubtedly petrol motor-escape vans are required for localities where stiff gradients have to be encountered. The type found to be satisfactory has the following general features: Four-cylinder engine, 6-in. bore by 5½-in. stroke, giving about 50 B.H.P., double ignition, *i.e.*, Bosch magneto and accumulator and coil; speed about 30 miles per hour. The engine is started up in the station every four hours, day and night. Where the engine room at the station is not warmed with hot water or gas radiators, electric heaters are hung over the front of the radiator to warm the engine and keep it ready for an immediate start in cold weather. The appliance weighs about 11,200 lb. fully laden, and has 4½-in. tyres on front wheels and 5½-in. on rear.

The first lorry to be procured was a standard 5-ton (11,200 lb.) machine from one of the largest lorry builders. It is fitted with a 4-cylinder engine, 5½-in. bore, and 6½-in. stroke, having an output of 55 B H.P. at 1,000 revolutions per minute, and is capable of a speed of 30 miles per hour. It is fitted with 5-in. tyres on front wheels, and twin 5-in. on rear. No non-skids are provided. A covered hood is fixed.

A second lorry has been ordered. This will be of the standard 3-ton (6,720 lb.) type, similar in most respects to the larger machine. It will have a 4-cylinder engine, 4¾-in. bore, and 5-in. stroke, giving an output of 45 B.H.P. at 1,000 revolutions per minute. Those at present in use for carrying principal officers to fires and other work are standard chassis by well-known makers. In one case large pneumatic tyres, 35½ in. by 5½ in. (895 by 135 mm.) are fitted, with detachable rims. On this machine four men are carried besides the gear mentioned previously (the total weight being 4,410 lb.) and no trouble has been experienced with the pneumatic tyres. Indeed, the instruction tender, which is of similar pattern and drive, has also been recently adapted for pneumatic tyres instead of solid ones.

Interesting details were given by the author of the means adopted for the prevention of skidding, and he stated that one appliance has run for a year without non-skids, but with soft rubber tyres of flat tread and extra wide section, single on front wheels and twin on hind wheels. Although no skidding has taken place, there is still some doubt if fire engines can be safely run under all conditions in London without some non-skid attachment. Front wheel brakes were tried on the appliances supplied by different manufacturers in 1910 in order (it was hoped) to obviate the effects of skidding, but whilst satisfactory results were obtained on tests, they were found unsuitable in practice, and have now being removed from the appliances, and rear wheel or differential brakes fitted instead. In the early stages of motor traction no saving was shown by its use, but with the improved standard commercial type chassis, and the continued experience of the drivers, there is undoubtedly a saving effected by the use of motor appliances.

MOTOR VEHICLE FOR SMOKE HELMET WORK.—London County Council at a meeting on November 25 agreed to obtain a motor vehicle specially designed for use in connection with smoke helmet work, in place of a horse-drawn engine, from Dennis Brothers, at £1,150.

## IMPERIAL MOTOR TRANSPORT COUNCIL.

This council has been formed, as a result of the unanimous desire of upwards of 200 Colonial delegates, who attended the Imperial Motor Transport Conference held in London in July last. The council will work in close touch with the Royal Automobile Club, the chairman of the club (Hon. Arthur Stanley) being also chairman of the council, and the meetings of the council being held at the club.

To enable the council to deal promptly with inquiries relating to the selection of industrial motor vehicles for service abroad, or the operation of vehicles in such service, a small Technical Inquiries Sub-Committee has been formed. This sub-committee consists of: Mr. W. Worby Beaumont, consulting engineer to the Chief Commissioner of Police and to the Royal Automobile Club (chairman); Mr. Ashton M. Heath, chief inspecting engineer to the Crown Agents for the Colonies; Mr. H. E. Wimperis, inspecting engineer to the Crown Agents for the Colonies; and Mr. Horace Wyatt, who will also act as hon. secretary of the sub-committee.

The council are in course of forming an Alcohol Motor Fuel Committee in accordance with the request of the delegates. This committee will conduct investigations and experiments relating to the use of alcohol as a motor fuel, the general opinion having been expressed by the delegates that considerable support would be forthcoming from the Dominions and Colonies in aid of work assisting towards the production of a permanent adequate suppiy of fuel within the Empire.

The principal objects of the Imperial Motor Transport Council are:

(I.) To act as a clearing house on all matters relating to motor transport throughout the Empire. To advise and consult with associated bodies and correspondents throughout the Empire who may require information on questions coming within the scope of the council, or who may desire to put before manufacturers statements of the conditions and requirements existing in various portions of the Empire.

(II.) To organise further conferences when such appear advisable in the interests of manufacturers and users.

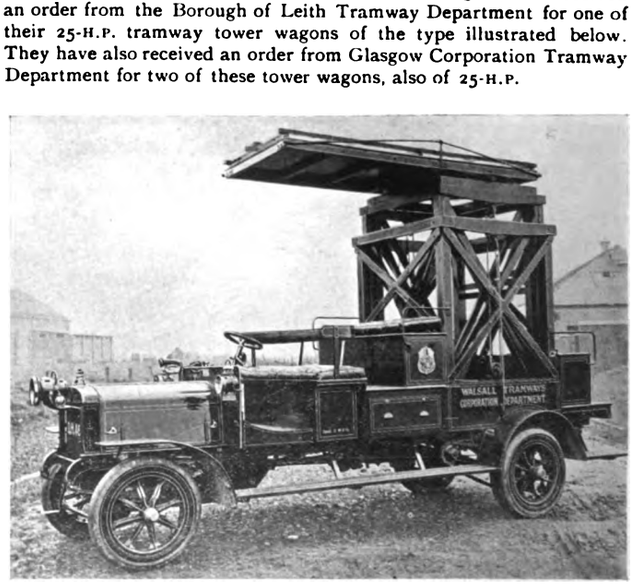
(III.) To form expert committees to consider any special matters of importance to which the attention of the council may be drawn by corresponding members or associated bodies.

(IV.) To publish periodical reports from information received through the medium of a system of correspondents throughout the Empire, and to arrange for the publication of matters relating to motor transport which would benefit by publicity.

The representatives of the Society of Motor Manufacturers and Traders on the Council are Messrs. S. F. Edge (president), E. Manville (ex-president), Sidney Straker (chairman of the Commercial Vehicles Committee, managing director of Messrs. Sidney Straker and Squire, Limited), Raymond Dennis (managing director of Dennis Brothers, Limited), F. Churchill, and R. Barry Cole (sales manager, Commercial Cars, Limited). The hon. secretary to the council is Mr. Horace Wyatt.

## MOTOR TOWER WAGONS FOR LEITH & GLASGOW.

Halley's Industrial Motors, Limited, of Yoker, Glasgow, have received an order from the Borough of Leith Tramway Department for one of their 25-H.P. tramway tower wagons of the type illustrated below. They have also received an order from Glasgow Corporation Tramway Department for two of these tower wagons, also of 25-H.P.




Type of Hallay Tower Wagon for Leith and Glasgow.

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# MOTOR TRAFFIC.

## MOTOR TRAFFIC NOTES.

MOTOR OMNIBUSES IN LONDON.—On September 30 the number of motor omnibuses licensed in London was 3,319.

POST OFFICE AND MOTOR TRACTION.—The authorities of the General Post Office in London are carrying out trials with a three-wheel electric delivery vehicle.

PETROL-ELECTRIC VEHICLE FOR PIETERMARITZBURG.—A 40-H.P. petrol-electric chars-a-banc has been ordered by the Pietermaritzburg Council, to be used in testing the traffic value of the various routes in and about the city.

AN ARGENTINE OMNIBUS SCHEME.—The Rosario Municipality has been informed by a firm in Buenos Ayres that they will shortly lay before the Council a proposal for the establishment of motor omnibus services in that city.

AN OMNIBUS QUESTION AT LINCOLN.—The Town Council has instructed the Electricity Works Committee to inspect systems of motor omnibuses and trolley vehicles, with a view to the promotion of a Parliamentary bill in November, 1914.

MOTOR VANS FOR VICTORIA.—The Victorian Railway Department have decided to inaugurate a system of parcels delivery by motor vans in Melbourne and in large provincial centres, in connection with the parcel-carrying business of the department.

ANOTHER ALL-NIGHT LONDON OMNIBUS SERVICE.—On the night of November 13 the London General Omnibus Company instituted a second all-night service of motor omnibuses—No. 94A—between Willesden and Liverpool Street. The service is half-hourly.

OMNIBUSES IN RANGOON.—The Electric Tramway Company appear to be meeting with success in the services which they have started with four Daimler 40-H.P. omnibuses. The vehicles are fitted with the C.A.V. electric lighting sets. The fare is one anna for the whole distance.

MOTOR TRACTION FOR NORTHWICH.—Leading men of this Cheshire town met publicly at the end of November and agreed to form a motor omnibus company with a suggested capital of £10,000. Twelve members of the Urban Council put their names down as investors of a total of £1,200.

PETROL-ELECTRIC OMNIBUS FOR LEEDS.—During November a Tilling-Stevens petrol-electric omnibus was placed in service between Moortown and Shadwell by the Leeds tramways department. The vehicle was supplied by W. A. Stevens, Limited, Victoria Street, Westminster, S.W.

WOLVERHAMPTON OMNIBUS SERVICES.—As it is their intention to submit at an early date a scheme for establishing a motor omnibus service between Queen's Square and the borough boundary at Compton Road, the Tramways Committee have refused to grant a licence to Mr. J. Beddard to run a similar service.

LONDON TRAFFIC COMPETITION AND TRAMWAY ASSESSMENT.—The rateable value of the London County Council tramway lines in the borough of Deptford has been reduced from £12,263 to £2,250 in consequence of the falling off in the receipts of the tramways, attributed, among other things, to omnibus competition.

DEMAND FOR WORKMEN'S FARES ON OMNIBUSES.—The National Association for the Extension of Workmen's Trains and Tramways have passed a resolution demanding that motor omnibus companies should be called upon to grant cheap fares to workpeople similar to the workmen's fares on the London tramway system.

MOTOR LORRY FOR LONDON FIRE BRIGADE:—At a meeting of London County Council on November 18 the Fire Brigade Committee recommended that an offer amounting to £615 by Dennis Brothers to supply a motor lorry for use in connection with the New Cross fire station should be accepted. This was agreed to.

NOTABLE ORDERS FOR LEYLAND VEHICLES.—Nottingham Corporation have purchased from Leyland Motors, Limited, two street-watering tank vehicles supplied with interchangeable refuse bodies. The company have received an order from the War Office for 55 lorries, making a total of 120 of these vehicles for military service.

SIZES OF SOLID TYRES.—The Solid Tyre Sub-Committee of the Society of Motor Manufacturers and Traders have presented a recommendation to the Commercial Vehicle Committee in favour of six wheel diameters, ranging from 670 mm. to 880 mm. The latter committee are obtaining the views of all members of the section on the proposals.

OMNIBUS CREATES TRAFFIC ON TRAMCAR ROUTES.—"One of those controlling London's tramway system" is reported as saying: "The panic talk as to the era of the tramway car having passed was unwarranted. The novelty of the motor omnibuses having worn off, the public are going back. The motor omnibus has also created traffic on the tramway car routes."

THE GRAVELEY SPLASH-GUARD.—The Graveley splash-guard, adopted by Messrs. Tilling, was mentioned at a meeting of Teddington Council when complaints were made of splashing by omnibuses. It was stated that this guard effectively prevented the nuisance, and the Council decided to request the omnibus company to adopt it on the vehicles running through Teddington.

ELECTRIC VEHICLES AT THE MOTOR CAR EXHIBITION.—Edison Accumulators, Limited, exhibited at the Motor Show at Olympia, on the stand of Messrs. Arrol-Johnston, a three-passenger Edison accumulator car, and they also had a number of similar vehicles outside for purposes of demonstration. The company's vehicles are attracting increasing attention, owing to the excellent results obtained from those in service.

MAIDSTONE AND DISTRICT MOTOR SERVICES.—This company have inaugurated two new services between Maidstone, Cranbrook, and Sittingbourne, which enable passengers to travel in a more direct route than is possible by railway, and also to avoid the changes of carriage that are necessary on the railway journey. One of the company's chars-a-bancs—a Leyland—is being used for Sunday trips to the seaside at Hastings.

ROADS FOR THE OPENING UP OF VICTORIA—The Country Roads Board, which was recently appointed in Victoria, after deciding what roads shall be declared main roads, are proposing to expend £2,000,000 on road construction during the next five years, half the sum being provided by the State, and half by the municipalities in the form of a loan payable in 31½ years. The conditions permit of the choice of a ruling gradient of 1 in 20 on the principal main roads.

A WELSH OMNIBUS SERVICE.—On November 24 an extension of the Llandudno-Conway motor omnibus service was made to Penmaenmawr. The distance of the entire route is nearly 10 miles. Seven journeys are made each day, with an extra run each way on Wednesdays and Saturdays. A special omnibus leaves the Grand Theatre, Llandudno, for Conway and Penmaenmawr when performances are given at the theatre. The services also cater for golf players at Conway.

STRAKER-SQUIRE ENTERPRISE.—Messrs. Sidney Straker and Squire, Limited, have appointed the F.D. Motor Company to be local representatives for Straker-Squire commercial vehicles at Liverpool. The agency for Monmouthshire and Glamorganshire has been awarded to Mr. J. A. Thomas, of Cardiff. A repeat order for two 3-ton lorries has been received from Ind, Coope, and Company, and a number of vehicles have been sold to the British-American Tobacco Company, Liverpool.

THE PROFIT ON A MOTOR CAR.—Before Mr. Under-Sheriff Burchell and a jury at the London Sheriff's Court, on November 12, Messrs. S. F. Edge, Limited, sued Mr. J. T. Pomar for damages for breach of contract. For the plaintiffs it was said that defendant agreed to buy a 30-H.P. Napier for £891, but he failed to carry out the agreement. The chassis and body cost Messrs. Edge £613, and they contended that they had lost £278 profit through the breach of contract. The jury assessed damages at £100.

ALUMINIUM IN THE CONSTRUCTION OF MOTOR VEHICLES.—An instructive booklet dealing with this subject has been issued by the British Aluminium Company, Limited, 109, Queen Victoria Street, E.C. One of the illustrations shows the aluminium panelling on a large chars-a-banc constructed by Leyland Motors, Limited, and reference is also made to the suitability of this metal for use in railway cars, and for motor engine and other castings. Some useful hints are given on working aluminium.

TRIAL OF OMNIBUSES IN AUCKLAND.—At the request of the authorities of the Exhibition held in Auckland (N.Z.), the Tramways Company put on a service of six motor omnibuses. Mr. C. G. Tegetmeier informed the shareholders at the annual meeting held in London, that although the directors did not think there was scope for the profitable operation of omnibuses, yet, if there should be an opportunity in the future of running motor vehicles to advantage, the company was not likely to leave it to others.

TILLING-STEVENS OMNIBUSES FOR JOHANNESBURG.—An order has been given by the Johannesburg Council for four more Tilling-Stevens petrol-electric omnibuses. For the bodies local tenders have been invited in order that local experience may be utilised to secure a body suitable to the climate. The decision to purchase the vehicles was

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# MOTOR TRAFFIC.

arrived at on the recommendation of the tramways manager after the experience of the running of a petrol-electric and another type of machine purchased in March last.

Omnibuses to Test Routes at Salford.—In explaining the intention of the Tramways Committee to apply for powers to run omnibuses, Alderman Linsley, chairman of the Tramways Committee, has stated that they desired to find out whether it would be worth while to construct tramways along various routes. The omnibuses would also serve to feed the tramways. The committee had been asked to extend the tramways to Irlam, but they could not do so because it would involve a loss. That was an instance where omnibuses might be useful.

Gateshead Tramway Company's Omnibus Services.—The motor omnibus service recently instituted between Scotswood, Blaydon, and Swalwell has been extended to Dunstan. For the whole distance the fare is 5d. An application to the Newcastle Tramways Committee for permission to run omnibuses over the Scotswood Bridge has not been entertained.—Stanley Council, after discussing their failure to secure adequate concessions from the North Eastern Railway Company, decided to invite the Gateshead Tramways Company to consider the question of running omnibuses in the district.

The New Surveyor for Kent.—In consequence of the appointment of Mr. H. P. Maybury to the post of chief engineer to the Road Board the Kent County Council have chosen Mr. H. T. Chapman, county surveyor of Somerset, to fill the vacancy. The salary will be £800, as against £600 Mr. Chapman has received in Somerset, and £1,500 paid to Mr. Maybury. The latter gentleman had long made the roads of Kent most favourably known among motorists, and of late years he has not been unsuccessful in providing a surface that will stand the wear imposed by heavy vehicles from the London area.

Yorkshire Tramways Company's Omnibuses.—A service of 40-h.p. Daimler omnibuses for the Cleckheaton district has been instituted by the Yorkshire (Woollen District) Tramways Company, Limited, who operate the electric tramways between Cleckheaton and Dewsbury. The vehicles serve the outlying districts of Scholes, Oakenshaw, Hightown, and Gomersal, connecting with the company's tramways at the two latter places, as well as at Cleckheaton. At a trial run on November 17 Mr. E. A. Paris, the tramways company's manager, gave a 20-mile journey to the members of the Cleckheaton Council and their ladies. The vehicles seat 30 passengers.

The Omnibus Question in Cape Town.—Reference was made at the annual meeting of the Cape Electric Tramways Company, held in London, to Greater Cape Town having been brought into being. The chairman mentioned that sufficient knowledge had been gained to convince the board that for a regular town service motor omnibuses were not required. The service to the docks, where the company possessed no tramway, had shown poor results, and would be discontinued if it were not better patronised. So far as they could see, however, motor omnibuses answered well in suburban districts as feeders for the tramways, and also for pleasure traffic on certain routes round the peninsula.

Liverpool Purchasing More Omnibuses.—Owing to their satisfactory experience with a Tilling-Stevens petrol-electric omnibus on the Garston route, the Tramways Committee are proposing to increase the omnibus service in the city. On November 17 members of the Committee visited London in order to inspect omnibuses of various types likely to suit the conditions obtaining in Liverpool. It is proposed to institute a service on the Ullet Road route to Wavertree from the Dingle, and afterwards to link up the three railway termini. Orders have been placed by the City Council with W. A. Stevens, Limited, the Brush Electrical Engineering Company, Limited, and Straker and Squire, Limited, for the supply of two motor omnibuses each.

Montreal Tramways Company Propose an Omnibus Route.—The directors of the Montreal Tramways Company do not seem disturbed at the reported intention of local and London financiers to seek to run a motor omnibus service with vehicles made by the London General Omnibus Company. Mr. E. A. Robert, the president, on November 13, presented an offer to the Board of Control for a 40 years' franchise, and said the company would construct more surface lines and several underground lines in return for the city making a number of street widenings. Mr. Robert also suggests a motor omnibus service for Sherbrooke Street. The company, he suggests, would pay the city 4 per cent. on all gross traffic earnings.

Electrical Ambulance for Asylum Work.—Recent developments in electric traction have led the Metropolitan Asylum Board to decide to make an experiment with an electric ambulance. Hitherto petrol-driven vehicles have been utilised, but the Ambulance Committee have reported they have always recognised that electricity provided the most suitable form of traction for ambulances employed in the conveyance of acute cases. On the recommendation of the Committee the Board have decided to purchase from "Cedes" Electric Traction, Limited, two chassis for £265 each, and two batteries for £85 each. These would be gearless and silent in operation. "Cedes" vehicles have for some time been in use in the London Fire Brigade.

Greater Omnibus Services, Limited, has been registered, with a nominal capital of £100 in 2,000 shares of 1s. each, to carry on the business of motor car and omnibus proprietors, etc., and to enter into an agreement with General Omnibus Supply, Limited. The directors are Stuart A. Curzon and Cecil S. Windsor, both of 98, Victoria Street, S.W.; F. W. Sanderson, of Ellesmere, Dudley Road, Wimbledon; and Thomas G. Lamb, of Sells, Limited, Fleet Street. The registered office is at 100, Victoria Street, S.W. Mr. S. A. Curzon is a director of the London General Omnibus Supply, Limited, of 98-100, Victoria Street, S.W., in the registration particulars of which he was described as "concessionaire to the London General Omnibus Company, Limited." The Somerset House file number is 130,046.

Albion Tower Wagon.—The illustration below shows a tower wagon constructed by the Albion Motor Car Company, Limited, of Scotstoun, Glasgow, which has recently been supplied to the South

**Albion Motor Tower Wagon.**

Shields Corporation. The machine has an engine of 32 h.p., and is fitted with a patent clutch of the Albion Company's own design, which is specially constructed to ensure easy control. In cases of tower wagons, when men are working at the top, the latter point is of importance.

Searle Unburstable Inner Tube.—Mr. Frank Searle, late chief engineer of the London General Omnibus Company, and now of the Daimler Company, Coventry, is one of the directors of the Searle Unburstable Inner Tube Company, Limited, who on November 25-27, offered for public subscription 55,000 7 per cent. participating cumulative preference shares of £1 each. The total capital is £75,000, the company being formed to acquire the business and assets of Hall and Searle, Limited, and the patents for the tube. The use of the tube saves the necessity of discarding old outer covers. It has been tested by the Royal Automobile Club. A sale of 20,000 tubes is estimated during the first year, giving a net profit of £16,000, equal to a dividend of 12½ per cent. on the preference capital. The purchase price has been fixed by the vendors at £36,000, allocated to goodwill, shares, and cash,

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THE

# Tramway & Railway World

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**Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.**

## NOTICES.

**All Communications and Advertisements for next Saturday's issue should be received not later than 3 p.m. on Friday.**

**Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**

**Telephone: No. 2948 GERRARD.**

## WEEKLY LIST OF TENDERS INVITED.

### CITY OF BELFAST.

TRAMWAYS DEPARTMENT.

TENDERS FOR THE SUPPLY OF TRAMWAY PASSENGER TICKETS.

The Tramways and Electricity Committee are prepared to receive tenders for the supply of Tramway Passenger Tickets for a term of three years, from January 1, 1914.

Specimens of the tickets required, and form of tender, may be obtained upon application to the General Manager, at the Tramway Office, Sandy Row, Belfast.

The estimated annual requirement is 70 millions.

The Committee do not bind themselves to accept the lowest or any tender.

Tenders, endorsed "Tenders for Tickets," are to be addressed to the undersigned, and must be received at the City Hall, Belfast, not later than 11 o'clock a.m. on Monday, December 22, 1913.

A tender, if sent by post, must be registered. If delivered by hand, an official receipt must be obtained for it. Otherwise, the undersigned will not be responsible.

R. MEYER,
Town Clerk.

City Hall, Belfast,
December 9, 1913.

### CITY OF CARLISLE.

ELECTRICITY DEPARTMENT.

INSTALLATION OF HIGH TENSION PLANT.

The Corporation of Carlisle invite tenders for the supply, delivery, and erection of the following plant:—

(1) Two 1,250 kw. High Pressure Turbo-Alternators ("Impulse" Type Turbines).
(2) Two Sets of Surface Condensing Plant for above Turbo-Alternators.
(3) Two 600 kw. Rotary Converters.
(4) High Tension Switchgear.

Specification, with general conditions and form of tender, may be obtained from the undersigned at the Electricity Offices, Victoria Viaduct, Carlisle, upon payment of a deposit of two guineas for each section, which will be returned after the tenders have been adjudicated upon, provided a *bonâ-fide* tender is sent in by the date specified and not withdrawn. Extra copies of each specification may be obtained at the sum of 5s. each, which is not returnable.

Tenders properly endorsed and sealed with wax to be sent to the undersigned not later than 9 a.m. on Wednesday, December 31, 1913.

The contracts are subject to the sanction of the Local Government Board, and the Corporation do not bind themselves to accept the lowest or any tender, nor will the Corporation pay any cost incurred in tendering.

FREDK. W. PURSE, M.I.E.E., M.I.Mech.E.,
City Electrical Engineer.

Electricity Offices, Victoria Viaduct, Carlisle,
December 10, 1913.

### CITY OF BRADFORD.

TRAMWAYS DEPARTMENT.

TENDERS FOR ELECTRIC TROLLEY VEHICLE EQUIPMENT.

The Bradford Corporation are prepared to receive tenders for the supply of Electric Trolley Vehicle Equipment, as follows:—

(a) 56 D.C. Series Traction Motors, 20 h.p., to specification.
(b) 28 Controllers, to specification.
(c) 28 Chassis, to drawings and specification.
(d) 30 Resistances, to specification.
(e) 60 Automatic Circuit Breakers, to specification
(f) 28 Junction Boxes, to drawings and specification.
(g) 60 Trolley Bases, to drawings and specification.

Schedules, with drawings and conditions of tender, may be had on application at the Tramways Offices, 7, Hall Ings, Bradford, on payment of the sum of five guineas, which will be refunded on the return of the tender form and drawings. Cheques to be made payable to the order of the Bradford Corporation.

The contract will be let subject to the Fair Contracts Clauses of the Corporation.

Tenders, endorsed "Electric Trolley Vehicle Equipment," to be sent to me not later than Saturday, the 3rd day of January, 1914.

The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford.

### COUNTY BOROUGH OF OLDHAM.

SUPPLY OF UNIFORMS.

The Tramways Committee are prepared to receive tenders for the supply and delivery of Uniforms for Tramway Employees.

Specification and conditions, with form of tender, and sample garments, may be seen on application to the Tramways General Manager, Wallshaw Street, Oldham.

Sealed tenders, endorsed "Tender for Uniforms," and addressed to the Chairman of the Tramways Committee, to be delivered at the General Manager's Office not later than Tuesday, January 13, 1914.

The Committee do not bind themselves to accept the lowest or any tender, and reserve the right to accept the whole or any portion of the tender.

Persons tendering must at the time of tendering, and at all times during the execution of the work, be paying all their workpeople not less than the standard rate of wages in the district where such workpeople are actually engaged in the execution of the work, and must be observing the hours and conditions of labour recognised by the associations of employers and the local organised body of workers in the various trades in such districts.

The contractor must also agree to comply with and conform to the provisions of the Trade Boards Act.

J. H. HALLSWORTH,
Town Clerk.

Town Hall, Oldham,
December 10, 1913.

### BOMBAY, BARODA, AND CENTRAL INDIA RAILWAY.

The Directors are prepared to receive up to noon on Tuesday, December 23, tenders for the supply of:—

Files.

Tenders must be made on forms, copies of which, with specification, can be obtained at these offices on payment of 10s. each (which will not be returned).

The Directors do not bind themselves to accept the lowest or any tender.

C. CROMMELIN,
Secretary.

Offices: Gloucester House,
110, Bishopsgate, London, E.C.,
December 11, 1913.

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### COUNTY BOROUGH OF NORTHAMPTON.

CORPORATION ELECTRIC TRAMWAYS EXTENSIONS.

The Corporation invite tenders for the Construction of a Double Line of Tramways to Far Cotton and the Doubling of a Section of the Kingsthorpe Route, together with the necessary Overhead Equipment, Underground Feeders, Telephones, etc.

The equivalent length of single track is about 3 miles. Plans may be seen, general conditions, specifications, bills of quantities, and forms of tender obtained at the office of Mr. Alfred Fidler, M.Inst.C.E., Borough Engineer, Guildhall, Northampton, on and after Saturday, the 20th inst., on payment of a deposit of £5, which will be returned in full upon receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tramways Extensions," to be delivered to the undersigned not later than 12 o'clock noon, on Monday, the 12th day of January, 1914.

The lowest tender will not necessarily be accepted.

HERBERT HANKINSON,
Town Clerk.

Guildhall, Northampton,
December, 1913.

### URBAN DISTRICT COUNCIL OF WATERLOO-WITH-SEAFORTH

TENDERS FOR MOTOR FIRE ENGINE AND APPLIANCES.

The above Council invite tenders for a Motor Fire Engine with Petrol-Driven Pumps, together with Fire Appliances and Canvas Delivery Hose.

Specifications and full particulars may be obtained from Mr. F. Spencer Yates, Assoc.M.Inst.C.E., the Surveyor to the Council, at the Town Hall, Waterloo, near Liverpool.

Tenders, endorsed "Fire Engine and Appliances," or "Canvas Hose," as the case may be, and addressed to the undersigned, are to be delivered not later than the first post on Wednesday, the 24th December instant.

The Council do not bind themselves to accept the lowest or any tender.

By order, JOHN I. THOMPSON,
Clerk to the Council.

Town Hall, Waterloo, near Liverpool,
December 4, 1913.

## POSITIONS VACANT.

### ROYAL BURGH OF KIRKCALDY.

TRAMWAYS DEPARTMENT.

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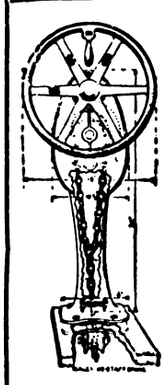

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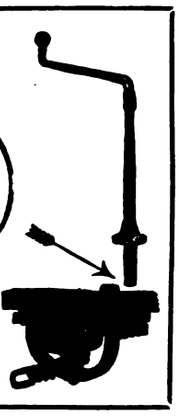


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THE
# Tramway AND Railway World

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SATURDAY, DECEMBER 13, 1913.

THE "OCEAN"

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## LABOUR TROUBLE IN LEEDS.

The extensive strike which began on Thursday, affecting practically every branch of municipal activity in Leeds except the tramways, must give ground for serious thought to all those people who are in favour of municipalising every sort of local public service. The demand of the trade unionists is that all men who have not received an increase of pay of 2s. per week should at once receive it. The Town Council recently refused the demand, and the strike is the result. About 3,000 men are now "out," and many others are involuntarily deprived of employment for the time owing to dislocation of industry. The tramway men have not so far cast in their lot with the strikers, as they are working under an agreement which does not expire till February next; but there is a possibility of their taking part should "blackleg" labour be taken into any of the departments, and, indeed, they threaten to come out to-morrow. The electric stations are only slightly affected by the strike so far, but many men have left off at the gas works and the cleansing department is disorganised. Many suburban streets have been left in darkness at night. It appears that to grant the demand of the strikers would mean a substantial addition to the burden of the rates, and both Liberal and Conservative members of the Corporation are united in resisting the trade unions' request. The trouble is that there are no fewer than sixteen Labour and Socialist members of the City Council, and they appear to be in favour of any request put forward for increased wages, no matter what the cost to the citizens may be. It is gratifying to find that the chairmen of the Corporation Committees who employ labour are tackling the subject in earnest, and are making all preparations for continuing the work of the Committees, even on a restricted basis. Offers to work have been received from great numbers of men, and if both sides stand firm it will only be a question of time for all vacancies to be filled. A very great proportion of the labour concerned is practically unskilled or of a nature which requires only a short period of learning, so that no great difficulty need be anticipated on that score. The unfortunate thing in the case of strikes of men employed in public utility work is that the local authority or company concerned cannot well declare a lock-out when outrageous demands are made; the necessity for carrying on the service without interruption is so paramount that no means can be neglected for securing that object. Hence the work has to go on as best it can with such men as do not strike and with such additional assistance as may be obtainable. This is what is being done at Leeds. The case of railway companies is analogous, for the train services must if possible be maintained. The threatened strike of Post Office employees is another case in point. Though some of the Leeds gas workers have broken contracts by striking because a foreman slacked some coke, it may be hoped that the tramway employees will not follow the evil example. So far at least as the car drivers are concerned, theirs is a skilled form of work, and substitutes cannot be found on the spot. In any case, it is to be hoped that the majority of the Corporation will stand firm and will be backed up by the great majority of the citizens. The mass of the people are not to be terrorised by extortionate demands of a minority. Even though many of the strikers have votes, they should be resisted in such a case as this where demands are unreasonable. A firm policy is often easier in the case of a company than in that of a local authority, but the latter have shown in various towns from time to time that it can be firm, and the result has been all to the good. The effect of the uncompromising attitude taken up and maintained by the Postmaster General towards the employees who threatened to strike for a 15 per cent. advance of wages should have a heartening effect on the people of Leeds and on their municipality.

## PARCELS TRAFFIC AT CHRISTMAS.

During the next two weeks the cars at certain times of the afternoon and evening will often be found to contain in the lower saloon more parcels than passengers. After several hours spent in shopping expeditions the owners of the packages become fatigued, and on reaching the havens of refuge provided by the cars they are apt, in some cases, to be a little inconsiderate. At very slight provocation their tempers are ruffled. Yet a conductor is bound to do his best to secure the comfort of other passengers, and it is possible that the men may be assisted in their tasks, and the convenience of all their fares be promoted, if a suitable notice is affixed to the car windows. This notification might be worded to the effect that "Christmas shopping is wearying alike to buyers and sellers. Do your part to relieve the strain on yourself and others by concluding your shopping and returning home on an early car." Or the notice might be to this effect: "Christmas shoppers can be of great assistance to the car employees and at the same time avoid personal discomfort by returning home before the evening rush-hours." The Sheffield management, like other places where there is not a separately organised parcels service, have lately had to deal with an abuse of the parcels

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regulations. Consequently orders were issued to the conductors to secure a more strict observance of the rules, as numerous complaints had been received of the platforms being loaded up with tradesmen's parcels, sometimes to the exclusion of passengers' luggage. Tradesmen have been asked to keep the size of their parcels within reasonable dimensions, as there have been several instances in which a mass of uncovered meat, too heavy for a boy to carry, had been brought by men to the car. Objection has also been raised to dripping fish and tripe. On account of conductors having in a few instances refused to carry persons bearing bulky personal belongings, the local newspapers have contained a flood of correspondence, which has necessitated the general manager seeking publicity for the true purpose of the instructions issued to the car crews. In reply he has received many suggestions that a charge should be made for parcels, and his answer is that the Corporation do not possess the statutory authority to adopt that course. The parcels systems in vogue at Manchester and Bradford have been specially pointed to as worthy of imitation, owners of parcels being able to purchase stamps to frank the conveyance of their loads without themselves using the car. It further appears that some years ago the Tramways Committee considered a proposal to institute a parcels system, but came to the conclusion that it was not a work for the municipality to take up.

## RAILLESS CAR ROUTES AT KEIGHLEY.

Keighley Council on December 9 adopted a recommendation by the Tramways Committee to enter into a contract with the Cedes Electric Traction, Limited, 112, Great Portland Street, London, W., for the supply and erection of overhead equipment on the Oakworth and Eastburn trolley vehicle routes at an inclusive price of £923 per mile, and for the supply of four trolley vehicles at £720 each. The approximate length of the Oakworth and Eastburn routes is six miles seven furlongs. The chairman of the Tramways Committee (Mr. Albert Smith), in moving the adoption of the recommendations, said that the system had been in operation on the Ingrow-Cross Roads route for seven months, and had proved very satisfactory. The company had lent the Corporation a vehicle on May 3, and the Corporation had been at no expense either in regard to the upkeep of tyres or any other part of the vehicle. The vehicle had run 9,194 miles and the receipts had been £433 19s. 5d., an average of 11.32d. per mile. There were three other systems of trackless cars in Yorkshire—at Leeds, Bradford, and Rotherham. The total cost per car mile in Bradford was 9.193d., and Rotherham was about the same. The Keighley motor omnibuses cost 1s. 4d. per car mile, and the revenue was 12.393d., so that there was a loss of at least 4d. per mile. The tramways manager estimated that the cost of the trackless car per mile, including interest on loans and sinking fund charges, would be 7.998d.; and as the revenue was 11.830d. per car mile they would be left with a substantial profit. The committee felt they would be able to get very near the estimated figure in regard to the cost, but even should the total expenses per car mile be as high as those in Bradford they would be left with well over a profit of 2½d. per car mile. In 1911-12 their omnibuses covered 121,205 miles, and calculated at even a penny profit per mile they would get a total profit of £500 for the trackless cars. On the experience of Leeds, Bradford, and Rotherham they should get at least a profit of 2d. per mile. Since the system was installed in the early part of the year the cost of labour and the price of material had increased, and the committee thought they had made a bargain in getting this new work done at the old price.

## WHEN P.A.Y.E. CARS ARE REQUIRED.

The question was raised at a meeting of Oldham Tramways Committee on December 5 of the stopping of cars by inside passengers when the conductor was on the top collecting fares. Councillor Calvert advocated the employment of trolley boys. The manager (Mr. Dugdale) said Manchester only had boys on the big cars carrying over seventy people. He would not have boys on the single truck cars. Councillor Elliot agreed with Councillor Calvert and referred to the number of fares missed on Saturdays. They did not collect the fares they were entitled to on the football cars. The Chairman: We ought to have the pay-as-you-enter cars for football traffic. Mr. Dugdale: There are people who set out to cheat us. Councillor Elliot: And they boast about it. Mr. Dugdale: They would do it if you had trolley boys. The matter was left with the manager.

## NEW AND PROSPECTIVE WORK.

CARLISLE.—Extensions of plant, etc., are to be made at the electricity works, at an estimated cost of £24,000.

BURY.—Extensions of 1,077 yards and a quarter of a mile are to be made to the tramway system.

NEWCASTLE-ON-TYNE.—By a unanimous vote the Corporation have decided to proceed with the Bill to authorise tramway extensions.

KEIGHLEY.—The Council have agreed to make application for sanction to borrow £16,100 for extensions to the plant at the electricity works to meet future demands for current.

GLASGOW.—On December 8 the Council approved of the provisions of a Provisional Order relating to tramway extensions and the erection of a bridge across the Clyde at Oswald Street, which will be available for tramways.

LEITH.—In connection with proposed extensions of the tramways, it is suggested that motor omnibuses might be first run to ascertain whether the amount of traffic would warrant the laying down of tramways. One route, it is stated, would only be a financial success if connected with the Edinburgh system.

BURNLEY.—Consideration is being given to a report submitted by the Tramways Committee for three extensions of the system to Abel Street, Stoneyholme, and Brunshaw. Although the committee had decided that a motor omnibus service to Stoneyholme would not be as cheap as a tramway, Councillor Lees said he would introduce a motion relating to such services later on.

GREAT YARMOUTH.—A great hindrance to tramway traffic is to be removed. At present the tramways are divided into two sections owing to the lines not running across the Hall Quay Bridge. On December 9 the Council adopted statutory resolutions approving the promotion of a Bill to authorise the Port and Haven Commissioners to construct a new bridge and approaches, and the Corporation to construct additional tramways and pay half the costs of the bridge. The bridge is estimated to cost £80,000, the tramway extension £6,500. Opportunity will be taken to pave the Hall Quay roadway with wood paving.

## L.C.C. TRAMWAY MATTERS.

COUPLERS FOR TRAILER CARS.

At last Tuesday's meeting of the London County Council the Highways Committee reported that in connection with the work of fitting couplers to ten standard cars for use with trailer cars, twenty coupler heads had been obtained from the A.B. Coupler, Limited, at a cost of £60. The Committee had also obtained from the firm one buffer head, six buffer head couplers for tractors, and three buffer head couplers for trailers required as spares at the price of 45s., 60s., and 45s. each respectively.

PAY OF FITTERS AND LABOURERS

A request had been made on behalf of the fitters employed at Greenwich generating station that their wages might be increased to the same extent as the increase agreed to recently for fitters employed at the central car repair depôt. That increase, the Committee recalled, was a halfpenny an hour and a further increase of a halfpenny an hour a year later. There were 17 fitters employed at the Greenwich station, and the Committee proposed that the matter should be referred to the Electrical Conciliation Board. Similarly it was recommended that an application by the fitters' labourers employed at the Greenwich station for an increase of pay from 6½d. to 7d. an hour should be referred to the same board. The rate included in the Council's list of wages and hours of labour for labourers in the engineering trades was 6d. an hour, and the Committee were of opinion that the request should not be agreed to, but they proposed the reference to the Conciliation Board as the men had made a request for it.

SUPPLY OF AXLE FORGINGS.

The following tenders had been received from selected firms for the supply of 100 axle forgings of 5¼ inch diameter:—

| | Price each. £ s. d. | Discount. |
|---|---|---|
| W. Beardmore and Co. | 2 0 6 | — |
| Cammell Laird and Co. | 2 1 9 | 2½ per cent. |
| Steel, Peech and Tozer | 2 3 3 | 2½ per cent. |
| Glasgow Railway Engineering Co. | 2 4 9 | — |
| John Baker and Co. | 2 6 6 | 2½ per cent. |
| John Brown and Co. | 2 8 9 | 2½ per cent. |
| Steel Company of Scotland | 2 12 6 | — |
| J. Batt and Co. | 2 14 6 | — |
| Brown Bayley's Steel Works | 2 15 0 | 2½ per cent. |
| Darlington Forge Co. | 3 2 6 | 2½ per cent. |
| W. Jessop and Sons (forgings only) | 19s. a cwt. | 2½ per cent. |

The lowest tender, that of William Beardmore and Co., Limited, was 20s. 7d. lower than that of Cammell Laird and Company, but the additional cost of inspection at the works of the former firm would considerably exceed this figure, and the Committee had therefore accepted the tender of Cammell Laird and Company, amounting to £203 10s. 7d. The estimate of the chief officer was £210.

PROSPECTIVE CONTRACTS.

In connection with the extension of the central car repair depôt it had become necessary to provide additional control gear and recording apparatus for use in the dynamo-metric testing of car motors, and the Committee recommended that tenders for the provision of these should be invited from selected firms. The Committee also advised that certain feeder pillar panels, switches, etc., were required, and that tenders should be obtained from selected firms.

The various reports were adopted.

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PENNY FARES.

Mr. J. D. Gilbert asked if the Highways Committee would consider the question of penny return fares.

Mr. Hume replied that the Committee were doing so, and would report in due course.

Mr. C. Jesson asked if the Highways Committee would report on the feasibility of a universal penny fare in London for the information of the public.

Mr. Hume replied that the revision of the fare stages were being considered, but a universal penny fare had not been dealt with. If the hon. member realised that the Highways Committee were doing their best to deal with competition he appealed to him not to press on them too strongly new points, because they must have time to see the effect of the alterations already made.

## MISCELLANEOUS NEWS AND NOTES.

**Side Guards.**—Experiments are to be made with a side guard on the Warrington Council's cars.

**Increased Speed at Bexley.**—The Board of Trade have been asked to approve of certain increases of speed on Bexley Council tramways now that new trucks, fitted with electro-mechanical brakes, have been adopted.

**Railless Cars for Morley.**—The construction of the railless trolley equipment from Morley to Leeds railless terminus at Farnley is expected to be undertaken at an early date. Leeds Council will supply the cars and work the system.

**Nottingham Tramways Joined with the County System.**—The Notts and Derby Tramways Company have extended their line from Cinderhill to the junction with the Nottingham Corporation Tramways at Church Street, Basford. Through service will be inaugurated early in next year.

**Facilities for Passengers at Darwen.**—It has been decided by the Tramways Committee in the cases of old people and cripples the cars shall pick up and set down at the nearest places to their homes, and not necessarily at the fixed halts. On Sundays stops will be made opposite the various churches.

**Railless Cars and Omnibuses for Aberdeen.**—The Law Committee of Aberdeen Council have adjusted the clauses in the new Provisional Order which is to be applied for. The powers asked for include the provision and running of railless trolley cars on three routes and motor omnibuses on three routes.

**Reconstruction of Roads for Motor Traffic.**—Essex County Council have agreed to spend £26,457 on paving various main roads in the Walthamstow district, Hoe Street and the Chingford Road costing between them £15,012. The work has been rendered necessary by motor omnibus and other heavy mechanical traction.

**Wolverhampton to Purchase Four Omnibuses.**—Upper Penn and Compton, the two principal outlying districts not yet served with adequate means of transit to the centre of the borough, are to be provided with motor omnibus services. The Corporation have decided to purchase four vehicles at an estimated cost of £2,744.

**Fare Questions at Salford.**—Proposals submitted by the Tramways Committee for reduced fares have been sent to the General Purposes Committee for consideration. Alderman Linsley, chairman of the Tramways Committee, said the committee were against halfpenny fares. The penny fare was the backbone of the undertaking.

**Doubling of Routes at Wallasey.**—Owing to the delay caused to the cars by single line tracks with loops on several important routes, the Tramways Committee have adopted a scheme for doubling the lines, and the work on the Seabank Road section is in progress. A sum of £10,000 is to be expended on an extension of the workshops.

**Availability of Workmen's Tickets.**—After considering an application that workpeople who were working overtime should be allowed to use their return tickets after the period during which they were available, the Bury Tramways Committee have decided that no alteration be made with regard to the holders of penny tickets, but with respect to 1½d., 2d., and 2½d. tickets these will be made available for return any time during the day of issue.

**Favourable Outlook at Newport.**—As the result of the increased fares and the efforts made to cultivate traffic, the receipts of the Corporation tramways for the past seven months show an increase of £2,085. Traffic is to be started at 9 a.m. on Christmas Day in order to cater for the traffic at a special football match, which when played at Cardiff last year drew an attendance of 25,000. Football traffic is responsible for a good portion of the increase in the receipts this year. On Christmas Day the employees will choose morning or afternoon turns of duty.

**Scottish Tramway Companies Combine to Meet Motor Competition.**—The newly-formed Scottish General Transport Company proposes to amalgamate the interests of the Greenock and Port Glasgow, Airdrie and Coatbridge, and Rothesay Tramway Companies with a view to preparations for future developments. The Greenock and Port Glasgow paid 6 per cent. to the ordinary shareholders for the year ended December, 1912. The Airdrie and Coatbridge Company paid 5 per cent. last year. The Rothesay undertaking have not yet paid anything on ordinary shares. Of late years the companies have had to meet competition by motor omnibuses, and the Greenock Company have established an omnibus service of its own.

**Effect of a Time Table on Receipts.**—Report was made to Oldham Tramways Committee that the receipts for the fortnight ended November 30 had increased by £300 over the corresponding period last year. Complaint was made by a member that sufficient time was not allowed to the motormen in congested streets, but the manager gave figures showing that 90 minutes were allowed for a 10-mile run, 70 minutes for 9 miles, 75 minutes for 6½ miles, 80 to 90 minutes for 9½ miles, and 70 to 75 minutes for 8¼ miles. Now that they had a time table the receipts were increasing, and they were getting traffic which they did not obtain before. At the request of the manager it was decided to write to the police concerning motor vehicles breaking down on the track. The Town Clerk stated that on a highway the by-law said that slow-moving vehicles must keep on the right side. Alderman Greaves said in Manchester the lorries were compelled to keep on the proper side of the track.

**The Hatpin Danger.**—While the London County Council tramcars on December 10 contained a notice directing attention to the danger of the unprotected points of women's hatpins, the Prefect of the Paris Police issued a notification forbidding the wearing of the pins, unless covered by a protector, in the stations and carriages of the Underground and other railways within the limits of Paris, in tramcars, omnibuses, or public vehicles of any description, in theatres and places where exhibitions are held, and in all public spaces where at any time persons may be in throngs or move in close contact.

**Omnibuses Introduced at Oxford.**—The recently-formed Oxford Motor Omnibus Company on December 5 started a service of motor vehicles. Application had been made in November for licences, and it is stated that owing to a misunderstanding the matter was not brought before the Watch Committee. Passengers obtain tickets from shopkeepers who are acting as agents. In other towns where unlicensed vehicles run the conveyances pick up and set down the passengers on private property. A town's meeting held on December 10 passed a resolution urging that licences should be granted to omnibuses on equitable terms. The Parliamentary Committee of the Council met on the same day and recommended that an injunction should be applied for to stop the running of the omnibuses. This will be considered at a special meeting of the Council next week.

**Tramcar Controllers.**—In a communication to the Tramways Associations the Board of Trade state that their attention "has been called to a source of danger which may arise in tramcar controllers. In the case of a recent accident, caused by a car getting out of control on a falling gradient, it was subsequently discovered that the insulation of one of the controller leads had become chafed in such a way that if contact took place with an adjacent (No. 3) terminal at the bottom of the controller, a short circuit across both armatures would be created, and the magnetic brake would thereby be rendered inoperative. The ordinary tests made before the car was put into service failed to detect any such short circuit, but it was subsequently proved by trial on the ground that, owing to vibration or some other cause, contact did take place, with the result that a short-circuit of the nature mentioned above was established." The Board ask that the question may be considered whether special precautions should not be taken to preserve the insulation of controller leads at points where its failure might lead to dangers of the kind indicated above.

**Leeds Tramwaymen and the Strike of Municipal Employees.**—On Thursday 3,000 workmen employed by the Corporation left work, against the advice of their leaders, in an effort to secure an immediate advance of 2s. a week all round. The tramwaymen are not directly affected in the dispute, for, under agreement, they are bound not to advance new claims to consideration until February. Their union, however, which is affiliated to the Federal Council, has promised moral support in the present dispute. The local secretary of the tramwaymen's union has stated that as soon as the first "blackleg" was brought into the tramways department to take the place of any man who had come out, the union would take a ballot as to whether their members would be prepared to cease work. The paviors went out on strike, and when about 120 men employed in the permanent way department of the tramways—men who are members of the Tramwaymen's Union—found they could not commence in the absence of the paviors, they described the position as a "lock-out." The men at the Whitehall Road electric lighting station have given a week's notice, and a similar action has been taken at the tramways power station at Crown Point. Yesterday a ballot was taken of the tramway union men on the question mentioned above, and the result was to be declared at midnight.

**Cedes Trackless Trolley Cars at Keighley.**—In the annual report of Keighley Corporation tramways, Mr. H. Webber, the electrical engineer and tramways manager, refers to the introduction of the Cedes-Stoll railless trolley cars in substitution for the petrol omnibus. He observes that, with the practical experience gained, the committee will not require much argument to prove that the new type of vehicle will not only give a regular service but comfort for the passenger. Mr. Webber adds that it would appear to be wise not to delay very much longer before starting the electrification of the other routes on which the motor omnibuses are at present in use. The power cost of the trolley vehicles is ascertained by a meter fixed at the commencement of the new overhead equipment, so that it takes in all line losses as well as the actual current consumption. The average obtained is 50 units for 56 miles run, or about .9 of a unit per mile. The charge for electricity is 1d. per unit. The total expenses per car mile is given as approximately 7d., whereas the estimate for the motor omnibuses is 1s. 3d. As the revenue on the omnibus routes averages 11d. per 'bus mile, Mr. Webber predicts a great success for the trolley vehicle, but warns the committee against increasing capital expenditure more than is absolutely necessary. An illustrated

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article by Mr. Webber, describing the working of the Keighley installation, appeared in THE TRAMWAY AND RAILWAY WORLD of October 16.

**Litigation Concerning Traction Current.**—In the Chancery Court on December 10, Mr. Justice Sargant heard the action of the Sunderland District Electric Tramways *v.* the Newcastle-upon-Tyne Electric Supply Company and the County of Durham Electric Power Supply Company, Limited, which related to the supply by the defendants of electric power for the running of the plaintiffs' tramway. Mr. Romer, K.C., for plaintiffs, said the relief asked for was a declaration that plaintiffs were entitled to the continuance of a supply of electric energy in the terms of an agreement, dated January 30, 1905, and for an injunction to restrain defendants from cutting off or discontinuing the supply. The point was whether under the circumstances the agreement was binding upon defendants, it not having been made with them, but with the Durham Collieries Electric Power Company. That company, from whom plaintiffs originally took the supply of electricity for running their cars, went into liquidation, and sold their assets to the first-named defendants. The County of Durham Electric Power Supply Company merely came in because it seemed the first defendants took some of the energy supplied from them, and it was from them that the first threat to cut off the supply came. It was announced later that terms, which were not mentioned, had been agreed to between the parties; and his Lordship made an order staying proceedings in the action on these terms.

## CONTRACTS AND ORDERS.

**Babcock and Wilcox, Limited,** have received a contract to supply two mechanical stokers to East Ham Council, at £534

**St. Helens Council** have allotted a contract for the supply of cable to Callender's Cable and Construction Company, Limited.

**The Lorain Steel Company** have secured the contract for special trackwork, amounting to about £42,000, for the St. Petersburg tramways.

**Keighley Council** have adopted the tender of the British Thomson-Houston Company, Limited, for supplying a spare motor, at £500.

**Siemens Bros. Dynamo Works, Limited,** have obtained contracts for the supply of Tantalum and Wotan lamps to the Metropolitan Railway Company.

**Sheffield Council** have placed an order with the Brightside Foundry Company, Limited, for installing hot-water apparatus at Holme Lane car depôt, at £73.

**Walsall Council** have given a contract to G. Robson and Co. for a combined electric track grinder and drilling machine, and to the General Electric Company, Limited, for sub-station gear, at £41 10s.

**Wolverhampton Council** have accepted the following tenders:—Willans and Robinson, Limited, 4,000 kw. turbo-alternator with condenser, and steam and water pipes, £13,159, and A. Reyrolle and Co., Limited, switchgear for the extension plant, £650.

**Mr. John Taylor,** of 7, Strand Street, Liverpool, has recently received the following orders for his patent tubular sand controllers:—Doncaster Corporation, 100; Sheffield Corporation, 122; West Ham Corporation, 192; Manchester Corporation, 60; Blackpool Corporation, 28; and Newport (Monmouth), Corporation, 12.

**Manchester Corporation** have placed contracts as follow:—1,800/2,200 kw. converter for Dickinson Street sub station, Bruce Peebles and Co., Limited; supply of 12 months' requirements of static transformers, Ferranti, Limited; cable, W. T. Glover and Co., Limited, Liverpool Electric Cable Company, Limited, Charles Macintosh and Co., Limited, and Johnson and Phillips, Limited.

**London County Council** have accepted the following tenders:—Cammell Laird and Company, 18 tons of special hard rolled steel, £184 10s.; British Westinghouse Company, 16 armatures (class 220), and 80 field coils of the same type, £38 18s. per armature and £6 per coil; A. B. Coupler, Limited, 20 coupler heads, £60, one buffer head, six buffer head couplers for tractors, and three buffer head couplers for trailers, 45s., 60s., and 45s. each respectively; A. and F. Manuelle, 8,300 tons of Guernsey granite setts required over a period of twelve months and delivered at various wharves and depôts, £13,858; Cammell Laird and Company, 100 axle forgings of 5¼ inches diameter, £2 1s. 9d. each, less 2½ per cent. discount, £203 10s. 7d.

## PERSONAL.

**Mr. G. F. Taylor,** electrical engineer and manager of Nelson Corporation tramways, has had his salary raised from £180 to £200.

**Mr. G. White** has been appointed rush traffic ticket inspector by the Mexborough and Swinton Tramway Company, after seven years' service as a motorman. He was formerly at Wakefield.

**Mr. W. Yorath Lewis** has been awarded the Society of Engineers' premium for his paper on "The Omnibus *v.* Tramway Controversy, and other Aspects of the London Traffic Problem," which was read at the meeting of the Society on February 3, and was referred to in our issue of February 8.

**Mr. L. C. F. Bellamy,** manager and electrical engineer, Ilkeston Corporation tramways, has reported that the traffic receipts during Fair week amounted to a record sum, and after consulting the chairman and deputy-chairman he had granted a bonus to each driver and conductor in recognition of their care in avoiding accident or missed fares. The committee approved this action.

**Glasgow Salaries.**—A special sub-committee of the Glasgow Corporation Tramways Committee recommend that the minimum and maximum salaries of the head of the department and principal assistants should be—General manager, £1,000, rising to £1,400 per annum, the annual increment being £50; present salary £1,100. Traffic manager, chief engineer, electrical engineer, and secretary and treasurer, £400 each, rising to £700 each, the annual increment being £25 each. The salaries of these assistants at present range from £625 to £425.

**Mr. Andrew Nance,** general manager, Belfast Corporation tramways, owing to indisposition which confined him to bed, was absent from the Tramway Committee's meeting on December 8. He, however, forwarded a report giving the information asked for as to the departments responsible in other municipalities for the repair and maintenance of the track. The consideration of this was held over until the end of the present financial year. Mr. Nance also submitted a report in reference to suggestions made by the Police Committee with regard to the congestion of traffic at Castle Junction, and this was forwarded to the Police Committee.

**Mr. W. T. Young,** on leaving Oldham Corporation tramways to take the position of traffic superintendent to West Ham Corporation tramways, has been presented with a gold albert and a gold pendant for Mrs. Young by the staff and employees. Mr. Dugdale, the manager, in making the presentation, observed that the recipient had risen from the bottom position in tramway work at Aberdeen, and in his new place he would have to contend with omnibus competition. In his reply, Mr. Young said he had tried to follow the motto of their Brotherhood, "Do unto others as you would that they should do unto you." If they did that there would be little trouble. He wished Mr. Dugdale a speedy recovery to health.

**The Rev. L. Blackburne,** president of the Portsmouth branch of the Tramway Brotherhood, was the preacher at St. Mark's Church on the occasion of a parade of the tramwaymen and police. The Mayor (Alderman Corke), chairman of the Tramways Committee, the members of the Corporation, and the officers of the two departments were also present. The preacher asked his hearers to remember that there was a Christian and an unchristian way of doing duty, and he reminded them that if they would seek to live up to the higher ideal in their daily lives, they would rise still higher in the opinion of the public. In proportion as they put themselves on one side, and thought not of their own good, but of the good of the whole, so would their service become truly efficient.

**Mr. Hopper,** chief assistant engineer and deputy manager to the Rhondda Tramways Company, has resigned that appointment in order to take up the duties of engineer and manager to an electric supply undertaking which the National Electric Construction Company are providing at Wisbech. In recognition of his six years' service at Rhondda he has been entertained at a farewell assembly by the staff and employees. Mr. H. J. Nisbett, the resident engineer and manager, who presided, said that whilst wishing Mr. Hopper success in his new undertaking, he felt that he was losing a valuable assistant. Mr. Hopper and himself had worked together for ten years, as they spent five years together at Sheerness before coming to Rhondda. In replying to the speeches Mr. Hopper said that the Rhondda Valleys were not the most ideal places for a tramway undertaking, what with floods, fogs, landslides and subsidences, to say nothing of narrow streets, level crossings, etc. The Porth Hospital Carnival Committee, of which body he has been a member, presented him with a gold-mounted walking stick.

**From Cleaner to Traffic Superintendent.**—In announcing at a presentation to the departing traffic superintendent at Oldham, that Mr. J. Brierley had been appointed to fill the vacancy on a twelve months' trial, Mr. Dugdale, the manager, said Mr. Brierley had worked up from the lowest rung of the ladder, and he thought he was worthy to be recommended for promotion. Mr. Dugdale strongly urged the young men to do all they could to improve their education and fit themselves for promotion. Two more men would shortly be promoted as motor inspectors and they would have higher rank than the ticket inspector. He thought they had two men in their shops fit for the work. Mr. Brierley began his career as a car cleaner on the Oldham steam tramways, and for a portion of his four and a half years' service in the steam traction era he also worked as a driver. When the electrification was effected in 1900 he became a motorman, and subsequently he entered the repair shop. After rising to be deputy shed foreman, he was appointed inspector six years ago, and in 1911 he became chief inspector.

**Mr. C. G. Tegetmeier,** chairman of the Swansea Improvements and Tramways Company, and Mr. S. E. Garcke, a director, attended the annual dinner of the employees. Mr. David James, the general manager, presided, and in proposing the toast of the company, said that the chairman joined the board the year following the opening of the electric system. From that time the company had been making steady, but continuous progress, and the shareholders saw some returns. A great deal of leeway would have to be made before adequate returns were given for the capital that remained idle. Mr. Tegetmeier was a man of great business capacity, and he had the utmost sympathy for his employees. Any suggestion or applications from them were always received in a sympathetic manner, and the directors had been very considerate in looking after the interests of the employees. Mr. James thanked the men for their help in the past, and assured them the success of the company was also that of the men's. Mr. Tegetmeier, in reply, remarked that on a previous occasion Mr.

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James stated that no service could be truly efficient unless it was a contented service, and he thought he could rightly assume that they were contented. In those days of industrial warfare it was pleasing to dwell upon their amicable relations. Mr. James had put in 33 years' service. Mr. Tegetmeier also referred to such old stalwarts of the company as George Mitchell (with 36 years' service), W. James (32 years), N. Davies (33 years), and David Atkins (36 years). Mr. James was a friend of all of them, and treated him (the speaker) just the same as he treated the men. Mr. James still preserved the energy and enthusiasm that distinguished him when he entered the service. The Mayor (Alderman Corker) referred to the splendid manner in which the tramwaymen turned out at the church parade on a recent Sunday, to the amicable relations between Mr. James and his men, and also to the great improvements in the town, particularly Castle Street.

## FINANCIAL REPORTS AND MEETINGS.

**Scottish Motor Traction Company.**—The directors recommend a dividend of 7½ per cent. (free of tax) for the year. A similar dividend was paid last year.

**Record Receipts at Sunderland.**—The traffic receipts up to the present are over £5,000 in advance of those for the corresponding period last year, and £800 better than the takings in any previous year for a similar period.

**New Central Omnibus Company.**—At a meeting of this London and Bedford Company on December 8, the chairman (Mr. J. O'Connor, M.P.) said that there was now accruing on the income bonds to be handed over to the company on the completion of the "deal" recently entered into with the Underground Electric Railways Company a sum which would enable the board to declare a dividend, free of tax, of at least 12 per cent., apart altogether from any dividend that might be declared on their holding of Underground A shares next February. It was decided to defer until next February the calling of the winding-up meeting.

**The British Electrical Federation.**—The traffic statement for the week ended December 6, 1913, shows that the receipts from tramways and railways amounted to £33,165, as compared with £35,513 in the corresponding week last year, and from omnibuses £11,842, as compared with £1,322, making a total of £45,007, as compared with £36,835. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show a decrease of £2,108 upon the week. The Auckland tramways (25 miles) were not working during this week, owing to labour disturbance in the town. The receipts for the corresponding period last year on the Auckland tramways were £4 767.

**New South Wales Railways and Tramways.**—The report of the Chief Commissioner for Railways and Tramways for the quarter ended September 30 shows that there was an increase in the tramway earnings of £28,573, and an increase in expenditure of £40,898, over the corresponding quarter of last year. The number of passengers carried increased by 4,260,260, and 570,730 additional miles were run. Further particulars with reference to the tramways are appended :—

| Tramways. | Three months Sept. 30, 1913. | Three months Sept. 30, 1912. | Inc. | Dec. |
|---|---|---|---|---|
| Miles open | 208½ | 202 | 6½ | — |
| Revenue | £430,012 | £401,439 | £28,573 | — |
| Expenditure | £386,880 | £345,982 | £40,898 | — |
| Tram miles run | 7,012,716 | 6,441,986 | 570,730 | — |
| Earnings per car mile | 1s. 2.d. | 1s. 3d. | — | 1d. |
| Expenditure per car mile | 1s. 1¼d. | 1s. 1d. | ¼d. | — |
| Percentage—expenditure to earnings | 89.97 | 86.19 | 3.78 | — |
| Number of passengers carried | 72,592,137 | 58,331,877 | 4,260,260 | — |

**Bradford Half-Yearly Accounts.**—The statement of accounts for the half-year, ended September 30, presented to the Tramways Committee on December 1, showed a profit of £21,178, as compared with £25,907 for the corresponding period of last year. The traffic income was increased by £9,001 and represents 11.7d. per car mile, against 11.3d. Traffic expenses showed a growth of £3,300, repairs and maintenance of permanent way £2,300, and maintenance of cars £5,400. The trading profit is £18 490 or £5,850 less than in the corresponding six months, but as the interest and sinking fund charges are reduced by about £1,000, the net result is £4,818 decreased profit. The railless system showed a deficit for the half-year of £105, as compared with £180 a year ago. The profit on the parcels department was £425, an improvement of about £109.

## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended December 6 amounted to £223,300, or £17,480 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £78 0s. 11d. per track mile, an increase of £4 0s. 10d. per mile as compared with last year.

## COPPER AND ALUMINIUM MARKET.

December 12, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, December 12. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) | 66 0 0 | 65 10 0 | 74 12 6 |
| ,, ,, (three months) | 65 5 0 | 64 5 0 | 75 12 6 |
| Electrolytic Copper—bars or ingots | 66 15 0 | 68 10 0 | 81 0 0 |
| Aluminium—bars or ingots | 83 0 0 | 83 0 0 | 87 10 0 |

## COAL MARKET.

December 12, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, December 12. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 26 0 | 26 0 | 23 3 | 22 6 |
| Best Seconds | 25 3 | 25 9 | 22 9 | 21 9 |
| Ordinary Drys | 23 0 | 22 6 | 21 6 | 20 4½ |
| Best Washed Nuts | 21 0 | 21 0 | 20 6 | 19 6 |
| Best Washed Peas | 19 6 | 19 6 | 18 9 | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) | 21 6 | 21 6 | 18 3 | 17 6 |
| Best Seconds | 20 9 | 20 6 | 17 9 | 16 9 |
| Ordinary Drys | 18 6 | 18 0 | 16 6 | 15 4½ |
| Best Washed Nuts | 16 6 | 16 6 | 15 6 | 14 6 |
| Best Washed Peas | 15 0 | 15 0 | 13 9 | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams | 15 6 | 15 3 | *Not Quoted. | 12 0 |
| Best Seconds | 13 0 | 13 0 | | 11 0 |
| Smalls | 7 0 | 7 0 | | 6 6 |

* Owing to North-Eastern Railway Strike.

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregates. Wks. | Aggregates. 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Dec. 9 | £59,056 | £64,356 | 49 | £2,727,705 | +£198 351 |
| Auckland (28 days) | Nov. 21 | 19,174 | 10,497 | 21 | 92,254 | — 4.949 |
| Ballarat and Bendigo | Sept. 28 | 1,095 | 883 | 26 | 22,632 | — 515 |
| Brazilian St. Rly. Mlrs | October | 44,563 | 52,219 | 13 | 153,572 | + 26,509 |
| Brazilian Traction | Dec. 6 | 84,177 | 95,257 | 49 | 4,419.737 | ... |
| Brisbane | Nov. | 24,310 | 27,053 | 48 | 287,071 | + 55,650 |
| British Columbia ... $ | October | 721,621 | 753,501 | 17 | 3,014,355 | + 279,148 |
| Buenos Aires Pt. & City | October | 6,615 | 7,142 | 43 | 68,109 | + 5,294 |
| Buenos Aires Lacroze | Nov. | 44,671 | 45.746 | 22 | 225,270 | + 8,901 |
| Calcutta Rs. | Dec. 6 | 65.796 | 68,580 | 49 | 31,67,584 | + 1,50,455 |
| Cape Town | Nov. | ... | 12,535 | ... | ... | ... |
| Carthagena & Herreria | Nov. | 1,703 | 1,922 | 47 | 28,165 | + 4,620 |
| Cordoba | October | 12,524 | 13,285 | 30 | 94,028 | + 9,280 |
| East India | Nov. | 1,924 | 1,922 | 17 | 7,833 | + 145 |
| Kalgoorlie | October | 2,955 | 2,652 | 43 | 29,099 | — 2.644 |
| La Plata | Nov. | 5,210 | 5,409 | 44 | 55,840 | + 9,626 |
| Lima | Sept. | 22,660 | 34,110 | 39 | 800,647 | + 23,783 |
| Lisbon Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Nov. 30 | 21,902 | 25,530 | 48 | 556,313 | + 41,833 |
| Melbourne | Nov. | ... | 63,500 | ... | ... | ... |
| Mexico $ | October | 586,273 | 616,007 | 43 | 5,732,338 | + 137,633 |
| Montevideo | Nov. | 29.628 | 30,530 | 4 | 80,530 | + 907 |
| Para | Dec. 7 | 4,161 | 3,501 | 1 | 2.501 | — 660 |
| Port Elizabeth | Nov. | ... | 3,530 | ... | ... | ... |
| Shanghai $ | Dec. 3 | 20,190 | 22,400 | 48 | 1,078,816 | + 126.306 |
| Singapore $ | Dec. 6 | 10,478 | 11,964 | 49 | 585,898 | + 75,981 |
| Toronto $ | October | 754,104 | 861,235 | 43 | 8,044,705 | +1,069,567 |
| Winnipeg $ | October | 321,039 | 357,313 | 43 | 8,328,748 | + 280,156 |

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1912-13. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Dec. 3 | £1,355 | £1,558 | + £203 | 27 | £44,678 | + £2,923 |
| Accrington Corp. | ,, 3 | 493 | 560 | + 67 | 35 | 20,408 | + 1,961 |
| Ayr Corporation | ,, 6 | 188 | 239 | + 51 | 29 | 12,476 | + 1,789 |
| Bath Electric | ,, 3 | 639 | 741 | + 102 | 49 | 46,982 | + 3,806 |
| Birkenhead Corp. | ,, 7 | 1,136 | 1,206 | + 70 | 36 | 40,757 | + 4,594 |
| Birmingham Corp. | ,, 6 | 11,810 | 12,612 | + 1,802 | 36 | 423,745 | + 37,557 |
| Blackburn Corporation | ,, 3 | 1,047 | 1,172 | + 125 | 36 | 47,915 | + 4,550 |
| Blackpool Corporation | ,, 4 | 500 | 644 | + 144 | 35 | 74,671 | + 12,040 |
| Bolton Corporation | ,, 7 | 2,465 | 2,581 | + 116 | 36 | 98,957 | + 5,878 |
| Bournemouth Corp. | ,, 10 | 1,453 | 1,616 | + 163 | 36 | 78,910 | + 9,496 |
| Bradford Corporation... | ,, 6 | 5,083 | 5,586 | + 503 | 35 | 214,306 | + 13,632 |
| Brighton Corporation... | ,, 7 | 784 | 828 | + 44 | 36 | 41,425 | + 2,962 |
| Bristol | ,, 5 | 6,432 | 7,517 | + 1,085 | 48 | 389,574 | + 52,377 |
| British Elec. Federatn. | ,, 5 | 36,835 | 45,007 | * | ... | ... | ... |
| Burnley Corporation .. | ,, 6 | 1,423 | 1,566 | + 143 | 36 | 61,726 | + 7,241 |
| Burton-on Trent Corp. | ,, 8 | 255 | 280 | + 25 | 36 | 10,528 | + 510 |
| Bury Corporation | ,, 7 | 1,229 | 1,288 | + 59 | 32 | 49,130 | + 2,107 |
| Cardiff Corporation | Nov. 29 | 2,331 | 2,620 | + 289 | 35 | 96,435 | + 10,521 |
| Chatham and District.. | Dec. 4 | 758 | 867 | + 109 | 48 | 41,791 | + 2,927 |
| Chesterfield Corp. | ,, 4 | 229 | 258 | + 29 | 35 | 9,257 | + 1,143 |
| Colne & Trawden | ,, 10 | 237 | 244 | + 7 | 49 | 13,386 | + 801 |
| Cork Electric | ,, 4 | 420 | 480 | + 60 | 48 | 24,206 | + 715 |
| Croydon Corporation ... | Nov. 28 | 1,636 | 1,503 | — 128 | 34 | 57,831 | — 5,704 |
| Darlington Corporation | Dec. 6 | 217 | 238 | + 21 | 36 | 9,008 | + 882 |
| Derby Corporation | ,, 6 | 858 | 923 | + 65 | 36 | 35,667 | + 3,075 |
| Dover Corporation .... | ,, 6 | 186 | 180 | — 6 | 34 | 9,274 | + 193 |
| Dublin & Lucan | ,, 5 | 111 | 119 | + 8 | 22½ | 3,353 | — 14 |
| Dublin United | ,, 5 | 5 250 | 4,955 | — 294 | 48 | 265,213 | — 15,932 |
| Dundee City | ,, 3 | 1,125 | 1,307 | + 182 | 29 | 38,375 | + 3,018 |
| East Ham Corporation | ,, 6 | 1,020 | 1,036 | — 16 | 36 | 36 871 | — 1,642 |
| Exeter Corporation | ,, 5 | 266 | 304 | + 39 | 36 | 12,634 | + 658 |
| Gearless Mo'or 'Buses. | ,, 6 | ... | 461 | ... | 35 | 17.452 | ... |
| Glasgow Corporation ... | ,, 6 | 18,582 | 20,759 | + 2,177 | 27 | 548 664 | + 42,028 |
| Glossop(U.Elec.Supply) | ,, 6 | 120 | 117 | — 3 | 49 | 6,334 | + 546 |
| Halifax Corporation ... | ,, 2 | 1,694 | 1,960 | + 267 | 35 | 75,760 | + 2,842 |
| Hastings & District..... | ,, 4 | 659 | 741 | + 82 | 49 | 50 845 | + 3,780 |
| Huddersfield Corp. | ,, 6 | 1,933 | 2,020 | + 87 | 36 | 77,033 | + 4,749 |
| Hull Corporation | ,, 6 | 3,003 | 3,202 | + 199 | 36 | 113,188 | + 6,263 |
| Ilford U.D.C. | ,, 6 | 402 | 464 | + 62 | 36 | 16,360 | — 887 |
| Ilkeston Corporation ... | ,, 10 | 112 | 121 | + 9 | 37 | 4,944 | + 771 |
| Ipswich Corporation ... | ,, 6 | 316 | 375 | + 29 | 36 | 17,057 | + 760 |
| Isle of Thanet | ,, 6 | 263 | 290 | + 27 | 10 | 3,816 | + 466 |
| Kilmarnock Corp. | ,, 6 | 146 | 165 | + 19 | 29 | 5,207 | + 575 |
| Lanarkshire | ,, 4 | 1,425 | 1,821 | + 396 | 48 | 82,939 | + 10,867 |
| Lancashire United | ,, 8 | 1,238 | 1,610 | + 372 | 48 | 75 257 | + 9,454 |
| Leeds City | ,, 6 | 7,499 | 8,070 | + 571 | 36 | 298,857 | + 19,202 |
| Leicester Corporation... | ,, 6 | 2,670 | 2,770 | + 100 | 49 | 137,291 | + 12,539 |
| Leith Corporation | ,, 6 | 590 | 645 | + 55 | 29 | 21.159 | + 1,067 |
| Leyton U.D.C. | Nov. 27 | 1,250 | 1,234 | — 16 | 34½ | 46,849 | + 532 |
| Liverpool Corporation.. | Dec. 6 | 11,947 | 12,880 | + 933 | 49 | 629,648 | + 47,493 |
| Llandudno & Colwyn B. | ,, 5 | 101 | 107 | + 6 | 1 | 107 | + 6 |
| London County Council | ,, 3 | 40,069 | 42,479 | + 2,410 | 35 | 1,490,601 | + 4,137 |
| London Gnl. Omnibus.. | ,, 6 | 55,107 | 58,958 | + 3,851 | 49 | 3,028,623 | + 509,524 |
| London United | ,, 5 | 5 239 | 5,707 | + 468 | 49 | 307.252 | + 6,689 |
| Lowestoft Corporation | ,, 6 | 154 | 183 | + 29 | 9 | 1,878 | + 173 |
| Maidstone Corporation | ,, 4 | 147 | 183 | + 36 | 36 | 7,531 | + 503 |
| Manchester Corp. | ,, 6 | 16.455 | 17 363 | + 908 | 36 | 634,942 | + 32.695 |
| Met. Elec. Trys. | ,, 5 | 8,035 | 8,638 | + 573 | 49 | 441,892 | + 15,553 |
| Nelson Corporation | ,, 6 | 174 | 183 | + 9 | 36 | 7.634 | + 455 |
| N'castle-on-Tyne Corp. | ,, 6 | 4,520 | 4,941 | + 421 | 35 | 175,924 | + 16,641 |
| Newport (Mon.) Corp... | ,, 6 | 678 | 760 | + 82 | 36 | 27,821 | + 2,336 |
| New St. Helens & Dist.. | ,, 3 | 664 | 777 | + 113 | 23 | 19,359 | + 2,102 |
| Northampton Corp | ,, 5 | 465 | 536 | + 71 | 36 | 20,338 | + 1,440 |
| Nottingham Corp. | ,, 4 | 3,042 | 3,312 | + 270 | 35½ | 120,026 | + 5.704 |
| Oldham Corporation ... | ,, 7 | 1,954 | 2.151 | + 197 | 37 | 82,049 | + 5,957 |
| Portsmouth Corp. | ,, 6 | 1,647 | 1 919 | + 272 | 36 | 84,649 | + 6,032 |
| Preston Corporation ... | ,, 3 | 740 | 825 | + 85 | 36 | 32 064 | + 2,145 |
| Provincial | ,, 6 | 1,512 | 1,644 | + 132 | 9 | 16,660 | + 1,236 |
| Reading Corporation .. | ,, 4 | 571 | 652 | + 81 | 35 | 25,004 | + 2,024 |
| Rochdale Corporation | ,, 6 | 1,332 | 1,458 | + 76 | 36 | 58,311 | + 2 640 |
| Rotherham Corp. | ,, 10 | 873 | 958 | + 90 | 36 | 36,563 | + 8,311 |
| Salford Corporation ... | ,, 8 | 4,958 | 5,143 | + 185 | 36 | 189 640 | + 8 166 |
| Sheffield Corporation... | ,, 7 | 7,104 | 7,335 | + 231 | 37 | 260.902 | + 22 303 |
| Southampton Corp. .... | ,, 3 | 1,018 | 1,231 | + 186 | 35 | 47,882 | + 3.247 |
| Southend-on-Sea Corp | ,, 3 | 513 | 674 | + 161 | 36 | 35,925 | + 6.303 |
| South Met. Trys. .... | ,, 5 | 704 | 1,040 | + 336 | 49 | 46,350 | + 5,383 |
| South Shields Corp..... | ,, 6 | 582 | 662 | + 80 | 36 | 26,095 | + 3.235 |
| Sunderland Corp. ..... | ,, 7 | 1,265 | 1.333 | + 68 | 36 | 52,447 | + 5 277 |
| Sunderland District ... | ,, 3 | 468 | 575 | + 107 | 5 | 2.819 | + 412 |
| Swindon Corporation ... | ,, 3 | 134 | 153 | + 19 | 35 | 5,959 | + 401 |
| Trys. (M.E.T.) 'Buses | ,, 6 | ... | 8,177 | ... | 45 | 248,458 | ... |
| Tyneside Trys.& Tmrds | ,, 3 | 417 | 470 | + 53 | 23 | 11.503 | + 792 |
| Wallasey Corporation | ,, 6 | 967 | 1.098 | + 131 | 36 | 44.677 | + 4.247 |
| Walsall Corporation .. | ,, 6 | 585 | 628 | + 43 | 49 | 30,547 | + 2,224 |
| Walthamstow U.D.C.... | ,, 6 | 615 | 712 | + 97 | 36 | 27,097 | + 950 |
| Warrington Corp ..... | Nov. 27 | 438 | 458 | + 20 | 35 | 15,018 | + 502 |
| West Ham Corporation | Dec. 4 | 2,158 | 2 694 | + 236 | 35 | 97,144 | + 3.900 |
| Wigan Corporation ..... | ,, 4 | 1,311 | 1 515 | + 204 | 35½ | 53,114 | + 5,399 |
| Wolverhampton Corp | ,, 10 | 1,044 | 1.044 | Nil | 37 | 39.727 | + 2.220 |
| Yorkshire (W. Riding) | ,, 7 | 1,255 | 1.333 | + 78 | 49 | 70.954 | + 7,391 |

* From such of the services as were working both last year and this year the receipts show a decrease of £2,108 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London..... | Dec. 6 | £5,624 | £5,400 | — £219 | 49 | £238 805 | + £5,103 |
| City and South London | ,, 6 | 3 056 | 2,836 | — 220 | 49 | 136 266 | + 12,932 |
| Liverpool Overhead..... | ,, 7 | 1,587 | 1,618 | + 31 | 49 | 83,914 | + 6,333 |
| London Electric..... | ,, 6 | 14,480 | 14.725 | + 245 | 49 | 668.270 | + 970 |
| Mersey ..... | ,, 6 | 2 212 | 2,119 | — 103 | 49 | 109.252 | + 4,599 |
| Metropolitan ..... | ,, 7 | 16,660 | 18,278 | + 1 618 | 49 | 846,655 | + 31,169 |
| Metropolitan District | ,, 6 | 12,818 | 13.020 | + 202 | 49 | 636 328 | + 17.945 |

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NORFOLK ST., W.C.

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, December 12. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 72 — 75 |
| £ | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | + ⅛ | 4⅝ — 4⅞ |
| £ | Do. 5½% Cum. 2nd Pref. | ... | 4⅛ — 4⅜ |
| 100 | Do. 4% Deb. Stk. Red. | ... | 90 — 92 |
| 100 | Do. 4½% Deb. Stk. Red. | + ⅛ | 97½ — 99½ |
| 100 | Do. 5% Deb. Stk. Red. | ... | 96½ — 98½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 101½ — 103½ |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum. Pref | ... | 3/16 — 5/16 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| | Bombay Elec. Supply and Trams. Co., Ord. | ... | 12 — 13 |
| 10 | Do. do. 6% Cum. Pref. | ... | 10¼ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | — 1½ | 87 — 89 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 6¼ — 6¾ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 4½ | 111 —115 |
| 100 | Do. Pref. Ord. Stock | — 1 | 102 —106 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | ... | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 98 —101 |
| 40 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 |
| 100 | Do. 4½% Perpetual Cons. Deb Stk. | ... | 92 — 95 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | — 3 | 84 — 87 |
| 10 | Do. 7% Non-Cum. Pref. | ... | 52 — 56 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 10 — 13 |
| 100 | Do, Deferred Ord. Stock | ... | 4 — 5¼ |
| 10 | Do. 5% Perpetual Debenture Stock | + 1 | 92 — 95 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 77 — 80 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 87 — 91 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb | + 1 | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. | ... | 5⅞ — 6⅜ |
| 5 | Do do. 5% Cum. Pref. | ... | 4⅛ — 5/16 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red | ... | 96 — 99 |
| 1 | Cape Electric Tramways, Ld., | ... | 3/32 — 5/32 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 100 | Do. 5% Debs., Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5¼ — 5½ |
| 100 | Do. 4% Debenture Stock Red, 1935 | ... | 92 — 97 |
| 10 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 89 — 93 |
| 10 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | + ⅛ | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | — ⅛ | — 10⅜ |
| 10 | Do. do. 6% Pref. | + ¼ | — 12 |
| 100 | Do. do. "A" Red. | ... | — 78½ |
| 100 | Do. do. Deb. Stock "B" Red. | — ¼ | — 77 |
| 10 | Gateshead & Dist Trys. Co., Ord. | ... | 9 — 9⅝ |
| 10/- | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | 3/32 — 5/32 |
| 1 | Do. do. 6% Cum. Pref. | ... | ½ — ¾ |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 84½ — 87½ |
| 10 | Imperial Tramways, Ord. | ... | 3½ — 4½ |
| 10 | Do do. 6% Cum. Pref. | ... | 6½ — 6¾ |
| 100 | Do do. 4½% Deb. Stock | ... | 76½ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | — ¼ | 2 — 2¼ xd |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — 1/16 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 xd |
| 10 | Do. do. 6% "B" do. | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 7/8 — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1⅛ — 1⅜ |
| 100 | Do. 6% Cum Pref. | ... | 1/16 — 1/8 |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | ½ — 5/8 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | + 1 | 96 — 98 |
| 100 | Do. Do 5% Cum, Inc. Deb. Stk. Red | + 1 | 86 — 89 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | .. | 59 — 63 |
| 100 | Madras Electric Trams. (1904), Lim., 6% Cum. Pref. | ... | 4⅜ — 5¼ |
| 5 | Do. do. 5% Deb. Stk., Red. | ... | 101 —103 |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | — 1 | 84 — 86 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk | — 2½ | 107 —110 xd |
| $1,000 | Do. do. 5% Bds. | ... | 98½ — 98½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | ⅞ — 1 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 83 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| $100 | Mexico Tramways Co., Common Stock | ... | 78 — 81 |
| $500 | Do. Gen. Con. 1st Mort. Gld. Bond | + 1 | 81 — 86 |
| 100 | Do. 6% 50-yr. Mort. Bonds | — ½ | 82 — 85 |
| .. | Michigan United Railways 5% 1st Mort. Gld. Bonds | ... | 91 — 93 |
| 10 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd | — 5/32 | 1/32 — 1/16 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 5⅞ — 6⅛ |
| 10 | Do. do. 5% Cum Pref. | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 5¾ — 6¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5¼ |
| 1 | Perth (W.A.) Elec Trams., Ld., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co. Ltd., Ord. | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum Pref | ... | 1/16 — 1/8 |
| 10 | Do. 4½% Debenture Stock, Red. | ... | 84 — 87 |
| 1 | Provincial Tramways, Lim., Ord. | ... | 3/32 — 5/32 |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 82 — 85 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. | ... | 5⅛ — 5⅝ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk | ... | 97 — 99 |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 84 — 87 |
| $500 | Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt 30-yr. 5% Gd. Bds. | + ⅛ | 100 —102 |
| 100 | Do. do. 5% 50-yr. Mort. Gold Bonds | + ⅛ | 90 — 92 |
| 10 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 97 —100 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | + 1 | 100 —103 |
| 10 | Shanghai Elec. Construction Co. | + ⅛ | 10 — 11 |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 86 — 90 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 5/16 — ¾ |
| 100 | Do. do. 4% Deb. Stk. | ... | 68 — 73 |
| .. | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | — 1 | 84½ — 86½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | — 1/16 | 4¾ — 5⅛ xd |
| 5 | Do. do. 6% Cum. Pref. | — ⅛ | 4¾ — 5⅛ .. |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 95 — 97 |
| 5 | Yorkshire (West Riding) Elec Trys. Co., Ord. | ... | 1/16 — 1/8 |
| 5 | Do. do. 6% Cum. Pref. | ... | 3½ — 4 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 81 — 86 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 31. LONDON, SATURDAY, DECEMBER 20, 1913. [Established in 1892.

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Including sixty-four issues, of which twelve are large Illustrated numbers, printed on fine art paper.

## NOTICES.

**Owing to the Christmas Holidays the next issue will be published on Wednesday.**

**All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Tuesday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**

**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

## COUNTY OF LONDON.

The London County Council invites tenders for the supply of six 5-ton Steam Commercial Motor Wagons fitted with jib cranes, and two 2-ton Petrol Motor Wagons.

Persons desiring to submit tenders can obtain the plans, specifications, form of tender, etc., on application to the Clerk of the London County Council, County Hall, Spring Gardens, S.W., upon payment to the Cashier of the Council of the sum of £1. This amount will be returnable only if the tenderer shall have sent in a *bonâ-fide* tender, and shall not have withdrawn the same. Particulars of the work may be obtained on personal application, and the specifications and other contract documents may be inspected at the County Hall before the payment of the fee.

The contractor will be bound to pay all workmen employed by him in and about the execution of the contract, or any part thereof, wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list, and such rates of wages and hours of labour will be inserted in and form part of the contract by way of schedule. Particulars of the Council's Standing Orders on these matters are given in the *London County Council Gazette*.

Tenders must be upon the official forms, and the instructions therein must be strictly complied with.

No tender received after 11 a.m. on Tuesday, February 3, 1914, will be considered.

The Council does not bind itself to accept the lowest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same has been opened, unless the reasons for the withdrawal were satisfactory to the Council.

LAURENCE GOMME,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
December 17, 1913.

## COUNTY BOROUGH OF WIGAN.

The Electricity Committee of the Wigan Corporation invite tenders for the following:—

1. Supply, laying and jointing of High Tension, 3-Core Paper and Lead-Covered, Armoured Feeder Cable.
2. Transformer and Switchgear.

Copies of specification, with form of tender, etc., may be obtained on application to Mr. James Slevin, Borough Electrical Engineer, Bradford Place, Wigan, on payment of £1 1s. for each specification, which sum will be returned on receipt of a *bonâ-fide* tender.

Plans can be seen at the Borough Electrical Engineer's office.

Sealed tenders, endorsed "Cable" or "Switchgear" (as the case may be), to be delivered to the undersigned on or before Monday, the 29th instant.

The Committee do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Town Clerk's Office, Wigan,
December 10, 1913.

## COUNTY BOROUGH OF WEST HAM.

TRAMWAY TICKETS.

The Council hereby invite tenders for the supply of Tramway Tickets.

Specification and form of tender may be obtained at the Office of Mr. J. S. D. Moffet, Tramways Manager, Greengate Street, Plaistow, London, E., upon payment of £1, which will be returned upon receipt of a *bonâ-fide* tender.

Note.—No tender will be considered unless the same is delivered at the Office of the Town Clerk, Town Hall, West Ham, E., in the envelope supplied, by Registered Post, not later than 12 o'clock noon on Tuesday, January 6, 1914.

The Council do not bind themselves to accept the lowest or any tender. The contractor will be required to enter into a bond, with one surety, for the due performance of the contract.

The contractor whose tender is accepted, and with whom a contract is entered into, will be required to pay to the whole of his workmen such rate of wages, and observe such hours of labour as are recognised by the Workmen's Trades Unions, and shall not assign, nor underlet, or make a sub-contract with any person or persons for the execution of any part of such work. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

By order of the Council,

H. W. GREAVES,
Town Clerk.

Town Hall, West Ham, E.,
December 19, 1913.

## CORPORATION OF EDINBURGH.

TO MOTOR OMNIBUS BUILDERS.

TENDERS FOR MOTOR OMNIBUSES.

The Magistrates and Council are prepared to receive tenders for the supply and delivery of Motor Omnibuses not exceeding six.

General description, specification, conditions of contract, sketch drawings, and forms of tender, together with any other information, may be obtained from Mr. A. Horsburgh Campbell, M.Inst.C.E., Engineer, Parliament Square, on payment by crossed cheque of £2 2s. deposit, which will be returned on the receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tender Motor Omnibuses," and addressed to the undersigned, to be delivered not later than 10 a.m. on Wednesday, January 7, 1914.

The Magistrates and Council do not bind themselves to accept the lowest or any tender.

THOMAS HUNTER, W.S.,
Town Clerk.

City Chambers, Edinburgh,
December 17, 1913.

## CITY AND COUNTY OF THE CITY OF CHESTER.

TO ADVERTISING AGENTS AND OTHERS.

Notice is hereby given that the Corporation of Chester are prepared to receive tenders for the exclusive right to use the Corporation Tramcars for advertising purposes, for a period of five years. The conditions and form of tender, and all other information, may be obtained on application to the Manager of the Corporation Tramways, at the Tramways Depôt, City Road, Chester.

Tenders (in sealed envelopes) must be sent to the Town Hall, Chester, on or before the 7th day of January, 1914, addressed to "The Chairman of the Tramways Committee," and endorsed "Advertising Tender."

The Corporation do not bind themselves to accept the highest or any tender.

J. H. DICKSON,
Town Clerk.

Town Hall, Chester,
December 17, 1913.

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### COUNTY BOROUGH OF SWANSEA.

ELECTRICITY DEPARTMENT.

The Corporation of Swansea invite tenders for one or two years' supply and delivery of :--

(*a*) Motors.
(*b*) Starting Switches.

Copies of the general conditions, specifications and forms of tender can be obtained on and after Tuesday next, the 23rd instant, from Mr. C. A. L. Prusmann, Borough Electrical Engineer, on payment of one guinea for each specification, which amount will be returned on receipt of a *bonâ-fide* tender. Additional copies of the specification can be obtained at 5s. per copy, which amount will not be returned.

Sealed tenders, endorsed "Motors," or/and "Starting Switches," to be delivered at my offices not later than noon on Thursday, January 8, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

H. LANG COATH,
Town Clerk.

Guildhall, Swansea.

### COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for Weldless Steel Pipes for feeding Boilers.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Five shillings will be charged for extra copies of specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Steel Pipes," and delivered not later than 12 o'clock noon on Wednesday, January 7, 1914.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS, M.I.E.E.,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

### COUNTY BOROUGH OF SALFORD.

CABLE CONDUITS.

Tenders required for 4,000 yards Doulton Pattern Three-way Brown Glazed Stoneware Cable Conduits.

Specifications may be obtained from the Borough Electrical Engineer, Electricity Works, Frederick Road, Salford.

*(Continued on page 547.)*


**POLE PAINTS**

E&RC

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Robert KEARSLEY & Co., Ltd.
RIPON, England.

**SIMPLEX CONDUITS, Ltd.**

GARRISON LANE, BIRMINGHAM.

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BITUMEN CABLES.
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TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
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*Telephone No.:* 5735 CENTRAL.
*Telegraphic Address:* "INBRAKE," LONDON.

*British, Foreign and Colonial Representatives:—*

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mittl. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 21, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.


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THE
# Tramway AND Railway World

**Established in 1892 and Published by**

*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.*

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SATURDAY, DECEMBER 20, 1913.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS.

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

## LESSONS OF THE LEEDS STRIKE.

Before dealing from the tramway point of view with some of the truths that should be taken to heart by all tramway authorities as the outcome of the Syndicalist strike at Leeds, we may be permitted to congratulate the City Council upon the firmness which they have displayed. It was that attitude alone that enabled the citizens to triumph over the conspiracy, and the slightest display of weakness would have been an encouragement to lawless agitators to attempt to involve other towns in similar trouble. The firm stand of the Corporation found a response in the formation of the Citizens' League, under whose auspices volunteers were forthcoming for the gas works and a power station, for the lighting of the lamps and for street scavenging. Rulers of other towns may be quite certain that Syndicalists will not be less active in their propaganda by the defeat at Leeds, and an effort should therefore be made in time of peace to organise the forces of law and order. The Leeds strikers recognised on Wednesday that the active participation of the citizens in the encounter meant speedy defeat, and a deputation from the Trades Council (which henceforth should be a suspected body) had the audacity to request the University authorities to prevent the students from giving their labour as stokers. The fact must also be recognised that Syndicalism would have no following unless there are men who seek notoriety and personal gain by acting as leaders. For tramway authorities there are several matters of interest emanating from the struggle. One is the question of the attitude of Tramways Committees to the so-called national executive of the Tramway and Vehicle Workers' Union. The withdrawal of the Leeds tramwaymen was in opposition to the rules. This is not the first occasion that men connected with the union have shown similar lawlessness, and the committees would be justified in considering whether they will have further dealings with a general secretary whose chief work seems to consist of being called in as advocate for the men who have struck. Thanks to the fixity of purpose of the Leeds Corporation, there will be no risk of outside interference there. But another point of equal, if not greater, importance arises, and that is the presence of a paid local secretary of the tramwaymen as a member of the Tramways Committee. This has, we believe, been the case in Leeds, and there is at least one other town in which a similar state of affairs exists. The local secretary has been the leader of the men in the encounter, which had for its object the infliction of any amount of damage upon the citizens and their property, in support of a demand for an increase of two shillings in wages all round. It is not wise policy for a representative of employees to be permitted to take part in the management of a department from which the men receive their wages. Perhaps the greatest offence of the tramwaymen was the deception which they practised. They had bound themselves to observe their present conditions of employment until next July. It is therefore plain that union men are not to be trusted. A statement appearing in another column shows that the question of imported labour at the power station was only a subterfuge. It had no weight with the citizens, who are entitled to defend their own property by either voluntary or paid labour. One satisfactory outcome of the strike is that the street paving department is to cease to exist, the work to be done in future by contractors. If the union men have the hardihood to apply for concessions when their agreement expires, it is to be hoped that they will be reminded of the loss they have inflicted this week upon the ratepayers and others.

## TRAMWAYS AS PERAMBULATING SWEET SHOPS.

The tramway policy of the London County Council has sometimes been criticised as lacking in originality and initiative. That charge has now been repelled once for all. The Council has given its colleagues in tramway management a lead such as few will even attempt to follow. Its enterprise will not only fill its cars with an aroma refreshing to its patrons, but it will carry the fame of the Council to the uttermost parts of the world. Automatic chocolate supply boxes are to be fixed in the upper saloons of double-deck covered cars. While the Council will allow the actual arrangements to be carried out by a contractor, it has been arranged that the job shall be thoroughly done. There must be no stint. Ten boxes—no less—are to be placed in each car, and the contractor must keep them filled, and what is more, he must collect the money from them. It is recognised that not even a "pay-as-you-eat" system would enable the conductor to attend to this business in addition to his other duties. Payment must be made, therefore, before the delivery of the chocolate. If there is no delivery after payment, then the passenger must see the contractor. All details, it will thus be seen, have been carefully worked out, except that of clearing the inevitable litter from the car floor. There seems to be no provision made for extra car cleaners or street sweepers at the termini; and it is possible that the rent of 50s. per car per annum, which the contractor is to pay, would not allow for the necessary expenditure. But something should be done. The police department recently declined to permit boxes for waste tickets to

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be put in the cars, and consequently little help can be expected from passengers; their pockets are generally filled, and there is no room for the sticky, gilded wrappings of the chocolate. The conductor has no time to collect waste paper, and the idea of an occasional bonfire on the car floor is clearly impracticable. Appeals must, we fear, be made to the enterprising contractor. Let him collect the rubbish and sell it for waste paper. The whole scheme, which opens up a new vista for tramway owners, is at present recognised as embryonic. The Council hope it will grow. Tramcars as peripatetic automatic restaurants, with profits on the scale of the popular cafés, may even yet prove tempting to investors whom the lure of "Greater Omnibus" enterprise has failed to attract. They might even give life to the market in tramway shares. It would be welcome. But we outrun the present. So far, all is experimental. The public must for six months limit their masticatory exercises to thirty-seven cars which run between Harlesden and Wandsworth, already known as the "chocolate" route. Later, it is hoped that the description may apply not only to every car, but to every route. The Council's ideal covers 2,000 cars, with passengers on each upper deck, "forty feeding like one." Then revenue will mount by leaps and bounds, and eager contractors will provide a rent for the boxes of nearly £4,000 per annum. But it is not merely the money that the Council want. In their report the Highways Committee explain this clearly. They say in so many words that "the supply of wholesome chocolate will afford a considerable benefit to tramway passengers." There is a sweet and engaging simplicity about this statement which is quite foreign to the matter of fact reports usually provided by the Committee. Guileless innocence may also be said to mark the reply of the Committee to the argument that they anticipate that the adoption of the chocolate boxes will lead to proposals for the automatic supply of other articles. The Committee's answer to this argument is that the grounds for providing passengers with the means of obtaining such an article as chocolate could not be advanced in the same degree in regard to any other article. It is felt that a tramway car cannot possibly become an American "store." In any case, too great a tendency in that direction, it is understood, would be promptly checked by the Commissioner of the Metropolitan Police. That officer has not yet given his consent to the new project, but the council hope that he will raise no objection to wholesome chocolate. It is true that he refused the project for the fixing of boxes for waste tickets. This useful scheme is in force in other towns, and revenue is got from the sale of old tickets as waste paper, but the Commissioner would have none of it; and if we remember right, he or his subordinates ordered a car experimentally fitted with these boxes off the street as "unfit for public service." If the chocolate box is rejected in like fashion, the decision will not therefore be wholly unprecedented, nor will it be greatly regretted.

## LINKING UP LONDON'S TRAMWAYS.

Last Tuesday the London County Council adopted an important report of the Highways Committee on the urgent necessity of linking up existing dead-end termini and otherwise consolidating the Council's tramway system. The Highways Committee said they were engaged in a careful study of the whole system with a view to improving the flexibility and usefulness of the system, to meet competition of other forms of traffic on more equitable terms, to facilitate further through running arrangements with outside authorities, and to make it easier to reduce the crowding together of the cars on certain lines.

Lack of success with previous schemes of the kind had been partly due to the failure of the Council to submit to Parliament a comprehensive scheme of development. The importance of the matter was accentuated by the findings of the recent Parliamentary Select Committee on Motor Traffic. The Highways Committee had directed the chief officer of tramways, the comptroller, the chief engineer, and the valuer to prepare a scheme for the consolidation and linking up. These officers would indicate the bearing of such proposals on the general tramway position, the cost and financial results of each tramway route separately, and the financial bearing of the scheme as a whole. To avoid delay the report was to be presented in two sections, the first giving details as to the lines which were necessary for which legislation should be promoted in the Session of 1915, and the second a general description with approximate figures of cost of lines which might hereafter be required. When the report was ready the committee would, if it appeared desirable, submit the scheme for examination and suggestion to an expert or experts to be recommended by the chief officer. The first part of the report would be available by about the middle of February next.

## SYNDICALIST STRIKE FAILS AT LEEDS.

Ostensibly on the ground that outside labour had been introduced into the Leeds power stations to fill the places of men who joined the strike of Corporation employees last week, the tramwaymen belonging to the Tramway and Vehicle Workers' Union decided, by 955 votes to 51, to withdraw their labour on Saturday last. It has transpired since that an agreement had been signed between the tramwaymen and the leaders of the other men that if the former came out to the assistance of the strikers the latter would give them support to the extent of a general strike in July next. In that month the tramway employees' agreement will be at an end, and they propose to negotiate fresh terms with the Corporation. Thanks to the formation of a Citizens' League, who provided volunteers as stokers at the power stations and gas works, and as sweepers of the streets, the various departments maintained their activity. The same remark is applicable to the tramways, although in the early part of the week the service had to be curtailed, while in order to prevent damage by stone-throwing the cars were withdrawn when darkness set in. Police reinforcements were forthcoming from neighbouring towns, and until Wednesday two constables accompanied each car. On the latter day the guard was reduced to one per car, and the man occupied a seat instead of being on the platform. About 100 motormen and conductors remained loyal on Saturday, and with the assistance of the clerical staff Mr. J. B. Hamilton, the general manager, was able to maintain a service of 70 cars upon all routes on Saturday. Each day saw an increase in the number of cars at work and in the number of employees who returned to work, foreseeing the failure of the Syndicalist venture to which they had been foolish enough to lend assistance. Mr. Hamilton was inundated with offers of help from the citizens, but he was able to rely entirely upon his own staff. From the first the tramways power station was also kept going with the department's own employees. By Tuesday the prospect of a wageless week-end proved sufficient to induce even the tramwaymen acting as pickets to desert their posts, and on Wednesday the workmen's car service was restored. On that day men began to dribble back to the other departments, and a much-advertised M.P. agitator, who had come to take part in an upheaval that was to have placed the citizens at the mercy of their employees, was suggesting that the men would be satisfied with reinstatement, abandoning the demand for an all-round increase of 2s. wages. A special meeting of the City Council, held on Wednesday, lasted only five minutes. The Corporation, on the motion of Alderman C. H. Wilson, decided to delegate all matters arising out of or in connection with the strike to a committee consisting of five aldermen, who are chairmen of committees, including Alderman R. A. Smithson, of the Tramways Committee. This body were given power to act, and the same evening they issued a statement instructing the chief officers of departments to receive up to 6.30 p.m. yesterday (Friday) applications from strikers for reinstatement. Nearly eighty tramway men turned at once, and on Thursday the remainder passed a resolution offering to resume work if they were accepted in a body. Mr. Hamilton's reply to this was that the men would be reinstated as quickly as opportunity offered.

## L.C.C. TRAMWAY MATTERS.

London County Council held their last weekly meeting before the Christmas recess on Tuesday, when a large number of reports were submitted. The next meeting will be held on January 20.

### ADDITIONAL TRAIL CARS.

The Highways Committee had considered the question of running a large number of trail cars on certain southern tramways, and application had been made to the Board of Trade. Pending the consent of that Board it was proposed that preliminary arrangements should be made. The Committee recommended that 150 new cars should be provided, and that 200 of the existing electric cars should be equipped with couplers. It was also proposed that tenders should now be invited, and that the tenderers should be asked to quote prices for 50, 100, or 150 trail cars. The specification for these should provide for (1) couplers of the type already supplied by the A.B.C. Coupler Company; (2) axle-box ball bearings of the Skelko self-aligning type; and (3) such special fittings as appeared to be most suitable in connection with the drop windows, blinds, and illuminated service numbers.

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CANCELLING RETURN AND TRANSFER TICKETS.

A cancelling apparatus, the Committee stated, had been made for the purpose of obviating the necessity of using exchange tickets to passengers presenting return tickets. It was proposed that 1,500 of these machines should be obtained, the assembly of the different parts to be carried out by the staff of the tramway department. The total cost would not exceed 11s. 6d. a machine, or about £900 in all. The use of these machines would effect a reduction in the number of classes of tickets required by the conductors, and a saving of about £1,500 a year in connection with ticket printing and checking.

PLANING HIGH CHECKS ON RAILS.

Reference was made by the Committee to the expense and slowness of the present method of removing high checks on tramway rails by burning off by the oxy-acetylene process. This method also necessitated taking up the paving. Each set of plant could only work over seven yards an hour, and the cost was 3s. a yard. The Committee had been in communication with John Stirk and Sons, Limited, Halifax, the patentees of a machine for cutting the high checks, and this firm had offered to construct a machine for £1,020, capable of making a cut 1-32nd of an inch deep at speeds of 15, 30, and 45 feet a minute. The price, including trolley standard, plough, and connections, would be £1,120. The firm stated that the machine would plane off high checks at a minimum rate of 67 yards an hour. Moreover, the use of the machine did not necessitate the removal of the paving. The cost was estimated at 3½d. a yard including debt charges and the cost of labour and material. The machine was capable of being adjusted to take any required depth of cut, and it could therefore be used to prevent the formation of high checks. It was recommended that the tender by John Stirk and Sons, amounting to £1,020 for the supply of the machine, should be accepted.

AUTOMATIC CHOCOLATE MACHINES ON CARS.

The Committee proposed that subject to the consent of the Commissioner of Metropolitan Police an agreement should be made with Mr. A. H. Vincent providing for the fixing as an experiment of automatic chocolate boxes on the upper saloon decks of 37 cars operated from the Hammersmith depôt, the boxes to be provided by the contractor and fixed at his expense. Mr. Vincent would also supply the chocolate and have the boxes filled as required, and would collect the cash in the boxes. He would pay to the Council a rent of £2 10s. a year a car irrespective of the takings, provided that each car was worked on at least 300 days a year. The arrangement would remain in force for six months. The Committee stated that if the experiment were a success and the cars generally were fitted with these boxes a revenue amounting to nearly £4,000 would be secured by the Council.

## MISCELLANEOUS NEWS AND NOTES.

**New Cars for Manchester.**—The tramways department have been authorised to construct 25 car bodies for bogie trucks.

**Wearing of Union Badges.**—Halybridge, Hyde, Moseley and Dukinfield Tramways Board have agreed to allow the employees to wear their union badges.

**Leeds-Bradford Through Service.**—During the week the strike at Leeds interrupted the through service to and from Bradford. The Bradford cars stopped at the boundary.

**Next Week's Issue.**—Owing to the Christmas holidays, our next issue will be published on Wednesday. All communications should, therefore, be received not later than 6 p.m. on Tuesday.

**Increased Speed at Sheffield.**—The Board of Trade have sanctioned the raising of all limits of 6 miles per hour on the tramways to 8 miles and all limits of 10 miles to 12 miles per hour.

**Standing in Glasgow Cars.**—During the ensuing holidays the rule which forbids passengers to stand in covered double deck cars will be relaxed. Conductors are authorised to allow not more than half a dozen passengers to stand inside the lower saloon at the driver's end.

**Burnley Goods Wagon.**—The Board of Trade have sanctioned the running of the goods wagon on the tramways for an indefinite period, subject to a speed condition, and on the understanding that it may at any time be prohibited if considered necessary by the Board.

**The British Electrical and Allied Manufacturers' Association.**—At the Council meeting, held on the 18th inst., the firms of Fraser and Chalmers, Limited, Johnson and Phillips, Limited, Thomas Kesnor and Co., Limited, and the Record Electrical Company, Limited, were elected members of the Association.

**A Leicester Fatality.**—One workman was killed and another injured on December 16, by the explosion of an acetylene cylinder used in connection with repair work on Leicester Corporation tramways. The machine was being cleaned, and the deceased man examined it with a light.

**Merit Scheme for Nottingham Employees.**—The Tramways Committee have approved of a merit rank scheme for motormen and conductors to take effect early in the New Year. It is to be substituted for the bonus arrangement, to which the men have raised objection, and it will entail an outlay of £1,250 per annum.

**Tramway Insurance.**—Walsall Tramways Committee have reported their recession of a resolution deciding that on the expiration of the existing tramway indemnity policy the Council should bear the risk of claims. The committee have accepted the offer of the Ocean Accident and Guarantee Corporation, Limited, to insure them against third-party claims for a period of five years on terms considerably more favourable to the Council than those of the existing policy.

**Developments at Nottingham.**—As soon as the materials can be obtained there are to be extensions of the tramways from Sherwood to Daybrook, Derby Road to Wollaton Lodge, and Carlton Road to Carlton. The Board of Trade have been asked to inspect the extension just completed to the Carlton Hill boundary of the city. Twenty new cars are shortly to be purchased.

**The Railway Track Supply Company** (of Great Britain), 81, Gracechurch Street, London, E.C., have placed on the market a patent rail anchor, known as the "R.T.S." rail anchor, for use with bull headed rails. Tests that have already been made with this device show that it will eliminate rail creep on bull-headed track. The company will be pleased to supply a few samples free of charge for trial purposes.

**An Unusual Mishap at Nelson.**—In the belief that the motorman was on the platform the conductor of a Nelson Corporation car on December 16 gave the signal to start, shifted the trolley arm, and released the brake at his end. The car was standing at the centre on the line leading to the Leeds Road section, and when it began to descend the slope the conductor saw that the driver had been left behind. Before the car was brought to a standstill it upset a horse and cart.

**Price of Energy for Walthamstow Tramways.**—After considerable discussion, extending over a period of some months, the Walthamstow Urban District Council have decided to reduce the charge for energy supplied to their tramways from 1⅜d. to 1¼d. per unit. As this will make a difference of some £500 per annum in the working costs the loss on the undertaking will be appreciably reduced. Even with the reduction the price still remains at a figure that can scarcely be justified.

**Municipal Tramways Association and Omnibus Traffic.**—London County Council have appointed the vice-chairman of the Highways Committee, the chairman and vice-chairman of the Local Government Records and Museums Committee, the chairman of the Public Control Committee, and Mr. H. H. Gordon and Mr. Henry Ward to represent the Council at the proposed conference with the Executive Council of the Municipal Tramways Association on the subjects of motor omnibus traffic, road maintenance, etc.

**Colonial Complaint Against British Manufacturers.**—The chairman of the Hobart Corporation tramways has presented a report from Mr. A. C. Parker, the general manager, stating that owing to the non-arrival of the points and crossings and the extra heavy rails for curves, the construction of the West Hobart extension had been delayed. The chairman said business men would bear him out that when orders were sent Home for materials and goods, etc., 12 months often elapsed before their arrival. He admitted, however, there had been a very great demand for rails from all over the world.

**No Christmas Car Services.**—Acting on a vote of Warrington Council, the Tramways Committee have agreed to give the tramways employees a full day's holiday on Christmas Day. As in past years, the car service will be entirely suspended in Nottingham. The Tramways Committee refused an application made by Notts Forest F.C. for a service to be run to the Meadow Lane ground. Consequently football followers will have to walk three or four miles. It was pointed out that were the concession to be granted, religious bodies and organisers of large parties would have an opportunity of asserting their claims.

**Effects of Car Meters at Derby.**—In the annual report of Derby Corporation tramways the economy in expenditure on current due to the use of traction meters is estimated at £745. As showing the effect of the meters on the driving it is mentioned that only 600 brake shoes were issued from the stores, a decrease of 320, notwithstanding a slight increase in mileage. The average consumption of electricity per car mile was 1,168 units, the lowest since the first year of the system, 1904-5, when the average was 1,042. The total consumption was 1,357,232 units at a cost of £8,109, these totals comparing with 1,480,150 and £9,026 respectively for the previous year.

**Birmingham and Trail Cars.**—Councillor Harrison Barrow, chairman of the Tramways Committee, has informed a Solly Oak audience that in April, 1911, the city possessed thirty-four miles of tramways, and on March 31 last there were sixty-two miles. The Corporation now had six hundred cars. The sum of £220,000 had been placed to the reserve fund and £215,000 to the sinking fund, on a capital of two millions. In four years they had practically put by 20 per cent. of the capital, which was a good record. The committee hoped shortly to have a number of trail cars running. These would be a great convenience to the workmen, greatly increasing the accommodation at a small expense.

**Increased Fares Yield Higher Receipts.**—A revised scale of fares has been arranged by the Paisley District Tramway Company. The general effect is to increase the charge from Paisley Cross to Renfrew, Barrhead, and Johnstone centres respectively by ½d. An additional stage has been added to the Renfrew section, making it even, in unison with the others. Workpeople will still have two stages for ½d., four for 1d., but seven stages will now be 1½d. instead of 1d. The increased charges do not affect travellers within the burgh or the immediate residential districts. When the new fares came into force on December 15 less workmen were carried on the Renfrew route, but Mr. Coutts, the manager, stated that the revenue was greater. If this diminution in numbers continued, he added, it would enable the company either to withdraw the car or by diminishing overcrowding to give greater comfort to those travelling. The missing passengers on the Renfrew section travelled by train.

**The Double-Deck Railless Cars for Brighton.**—Having regard to the fact that the conditions of traffic in the chief business through-

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fares forming the through route between Brighton and Hove are very different from those pertaining in other towns where railless traction has been adopted, the Hove Corporation have asked Brighton Council to first try the double-deck cars on a test route. This type of car has been sanctioned by the Board of Trade subject to the overall width being reduced to 7ft. and to the body of the vehicles being at least ten inches above the surface of the road. The Board also state that the sanction will be subject to such special regulations as to speed, stops, passing points, etc., at narrow places as may be found to be necessary when the inspection of the system takes place. Brighton Corporation on December 18, on the recommendation of the General Purposes Committee, decided to equip a section on the Preston Road route, at a cost of £115, and to run the double-deck vehicle thereon for demonstration purposes. Although passengers may ride, no fares will be taken. The thoroughfare will be closed after January 19 next in order to permit the relaying of the tramway track and wood paving, but the committee consider that the interval will be amply sufficient for a demonstration of the capabilities of the car. The committee have themselves no doubt respecting its efficiency.

**Tilling's New Commercial Vehicles.**—For some time past Thomas Tilling, Limited, have been using, in connection with their business, special delivery vehicles of their own manufacture, suitable for dealing with loads up to two tons. These vehicles proved most satisfactory, and as a number of users of commercial vehicles had approached Messrs. Tilling to supply motor vans and lorries of their manufacture, of capacities up to two tons, for speedy deliveries, a number of these have been supplied and are being used by the General Post Office, London County Council, Glyn, Mills, Currie's Bank, Messrs. Peek, Frean, Messrs. McVitie and Price, and Fremlin Bros. The demand for these vehicles has, however, so rapidly increased, and the capacity of Messrs. Tilling's London works has been taxed to such an extent, that they are unable to cope with orders, and as a consequence have made arrangements with W. A. Stevens, Limited, whose works at Maidstone have during the past year been considerably enlarged, to manufacture the vehicles and handle the sales. For the heavier type, to deal with loads from 2½ to 5 tons, the Tilling-Stevens petrol-electric chassis, which is manufactured by W. A. Stevens, Limited, will be supplied, but in order to distinguish the two types of vehicles, those for loads up to two tons will be known as the Tilling chassis. Vehicles for heavier loads will be known, as heretofore, as the Tilling-Stevens petrol-electric chassis. Full particulars, prices, etc., for both types can be obtained from W. A. Stevens, Limited, 26, Victoria Street, Westminster, S.W.

## CONTRACTS AND ORDERS.

**Leyland Motors, Limited,** have received an order from Accrington tramways department for a petrol motor tower wagon.

**Prahran and Malvern Tramways Trust** have given a contract to the Steel Company of Australia for points and crossing, at £917.

**Winnipeg Council** have awarded contracts to the Canadian General Electric Company for three 600 kw. transformers and to Ferranti, Limited, for switches.

**Halley's Industrial Motors, Limited,** have received two orders for petrol tower wagons from Glasgow Corporation, and a second order from Leith Council for a 25 h.p. tower wagon.

**The Anger Manufacturing and Supply Company, Limited,** of Bank Chambers, Preston, have received an order for 150 more sets of their brake adjuster for the Anglo-Argentine Tramways of Buenos Ayres.

**Norwich Council** have placed a contract with C. A. Parsons and Co., Limited, for a 3,000 kw. turbo-alternator, complete with condensing plant, at £8,588, two 1,200 kw. rotary converters by Siemens Bros. Dynamo Works, Limited, at £4,240.

**Chesterfield Council** have placed the following contracts:—Three car bodies at £469 each, Brush Electrical Engineering Company; electrical equipment for three cars, at £282 per car, and electrical track brakes at £55 each, British Westinghouse Company.

**West Hartlepool Council** have allotted contracts as subjoined:—Five tramcars with flexible axle trucks, United Electric Car Company, Limited; electrical equipments and spare parts, Dick, Kerr and Co., Limited; points and crossings, Hadfield's Steel Foundry, Limited. Mr. W. S. Tatham, of West Hartlepool, is to be negotiated with in reference to his quotation for taking out the quantities for the car shed extension.

**Siemens Brothers Dynamo Works, Limited,** have received the contract for supplying the switchgear and accessories for the electric power station in connection with the Melbourne suburban railway electrification scheme, the amount being £140,000. The plant will be manufactured in Great Britain. The contract for the condensing plant has been awarded to the G. Weymouth Proprietary, Limited, of Richmond (V.), at £85,251.

**London County Council** have accepted the following tenders:—John Stirk and Sons, Limited, Halifax, machine for cutting high checks on tramway rails, £1,020; Mr. R. L. Lundgren, Queen Victoria Street, E.C., 125 tons of white and 200 tons of coloured pulp for tramway tickets, at £10 a ton for white and £11 a ton for coloured, less 5 per cent. discount; Mr. R. R. Todd, High Holborn, W.C. (agent for Felten and Guilleaume), 2½ tons of T.C.C. copper wire, .220 inch diameter, £84 11s. 8d. a ton, and 7½ tons of D.C.C. copper wire, .220 inch square, £85 15s. a ton, both less 2½ per cent. discount; Newton Brothers, spare materials for reconstruction and re-winding of motor generators, £320 7s.; J. G. Ingram and Son, Hackney Wick, N.E., repair of 200 burnt and damaged moulded indiarubber plough bases, £206 5s.

## PERSONAL.

**Mr. J. B. Hamilton,** of Leeds, has been engaged to advise Ealing Council in the negotiations with the London United Tramways Company.

**Mr. J. Wild,** inspector in charge of the railless trolley cars of Ramsbottom Council, has received an increase of salary and been appointed manager.

**Mr. Gordon Bryant,** electrical engineer to Great Yarmouth Council, has had his salary increased from £400 to £450, to be followed next September by an addition of £50.

**Alderman Smethurst** is to be presented by the Warrington Electricity and Tramways Committee with a vote of thanks, engrossed on vellum, in recognition of his many years' service on the Committee.

**Mr. H. Underwood,** repairs foreman at Greenwich generating station of London County Council tramways, has been appointed boiler house charge-engineer, at a salary of £250 a year, rising by annual increments of £10 to £300 a year.

**Mr. L. Garner McLean,** chief assistant power and distribution engineer to the London United Tramways Company, on leaving to take a position in India, has been presented by the staff with a case of drawing instruments, a pipe, and a cigarette holder.

**Messrs. C. W. Bentley and R. Watson,** respectively manager and electrical engineer and secretary of the Musselburgh Tramways Company, were referred to by Bailie Constable at the annual concert of the Recreation Club, as having interested themselves in all that tended to the welfare of the borough. He also spoke of the civility of the employees, and remarked that the tramways had done much to give the people better travelling facilities, for the competition had induced the railway company to give a better train service.

**Mr. A. C. Morgan,** late manager to the Burmah Electric Tramways Company, was referred to by Mr. Ellis, who presided at the annual meeting. He joined the company's service at the beginning of the company's operations as assistant manager, and since August, 1908, had been in charge. The chairman stated that Mr. Morgan retired on October 31 on the expiration of his agreement, and the directors desired to place on record their appreciation of the excellent services rendered by Mr. Morgan. As the system was now thoroughly well organised, the directors had not filled the vacancy, and the duties were being carried out by the chief engineer, Mr. A. H. Burbidge, under the title of chief engineer and manager. Mr. Burbidge went out from England quite recently, and had had a very thorough experience of similar work here.

**Glasgow Salaries.**—By 32 votes to 19, the Corporation have adopted the following scale of salaries recommended by the Tramways Committee:—General manager—Minimum salary per annum £1,000, maximum salary £1,400, annual increment each year until the maximum is reached £50; salary of present holder of the office, £1,100. Traffic manager—Minimum £400, maximum £700, annual increment £25; present salary, £625. Chief engineer—Minimum £400, maximum £700, annual increment £25; present salary, £625. Electrical engineer—Minimum £400, maximum £700, annual increment £25; present salary £575. Secretary and treasurer—Minimum £400, maximum £700, annual increment £25; present salary, £425. Replying to an objection that the general manager's ultimate salary of £28 per week would be more in pounds than the lower-paid conductor would have in shillings, Mr. Alexander said that general managers of tramways such as those in Glasgow received much larger salaries than they had ever thought of paying Mr. Dalrymple. Denying that they had turned a deaf ear to the workers, he compared the wages and hours of the men when the Corporation took over the tramways with those of the present time.

**Inspector T. Meadows,** of the Southport Tramways Company, died suddenly on December 16, at the age of 65. For many years he had had charge of the traffic in London Square.

**Mr. John Glenn,** consulting engineer to the Portsdown and Horndean Light Railway, and a director of the company, died a few weeks ago. At the annual meeting of the sick benefit club of the employees, Chief Inspector W. Mathews proposed a vote of condolence with Mr. J. Fereday Glenn, the engineer and manager, and son of the deceased gentleman. Mr. Glenn, who was 75 years of age, had been connected with the Provincial Tramways Company for forty years as consulting engineer to that company and its local undertakings. He was a brother of Mr. J. Barber Glenn, the managing director.

## FINANCIAL REPORTS AND MEETINGS.

**The British Electrical Federation.**—The traffic statement for the week ended December 13, 1913, shows that the receipts from tramways and railways amounted to £32,178, as compared with £36,863 in the corresponding week last year, and from omnibuses £12,147, as compared with £1,688, making a total of £44,325, as compared with £38,551. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show a decrease of £4,564 upon the week. No receipts are included from Auckland tramways, the services having been temporarily suspended owing to the strike of wharf labourers. Full services have since been resumed, and are now working normally.

**A Warning from Newcastle-on-Tyne.**—Alderman J. H. Rodgers, presiding at a meeting of the Newcastle Corporation Tramways Committee, stated that during the last half-year the receipts had been £123,000, compared with £111,000 in the corresponding period of last year. The expenditure had increased by £11,000, and 2¾ million more passengers had been carried. Owing to the altered

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judgment in the Tottenham rating appeal, the committee had to pay back over £3,000 for rates which they had allowed last year under the judgment. The net surplus had decreased nothwithstanding the very large increase of traffic. This was due to the increased cost of carrying on the department. The men had got more money, and there had been more men engaged to do the extra work. Now that the system was getting older the repairs were getting heavier, and coals were almost double the price. During the half-year they had spent out of the reserve fund £21,060 for re-laying cables, alterations to cars, the re-laying of the permanent way, and new machinery at the power station, etc. This work would continue each half-year, and the possibility was that during the next six months there would be anything from £10,000 to £20,000 thus spent; and it would be necessary to build up that reserve fund again to the extent that they were depleting it. They could not go on granting concessions right and left.

## COPPER AND ALUMINIUM MARKET.

December 19, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Friday, December 19. | Last week. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. | 64 5 0 | 66 0 0 | 75 5 0 |
| ,, ,, (three months) .. | 64 5 0 | 65 5 0 | 76 7 6 |
| Electrolytic Copper—bars or ingots | 66 15 0 | 66 15 0 | 81 10 0 |
| Aluminium—bars or ingots .. .. | 83 0 0 | 83 0 0 | 86 10 0 |

## COAL MARKET.

December 19, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Friday, December 19. | Last Week. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 26 0 | 26 0 | 23 9 | 22 6 |
| Best Seconds.. .. .. | 25 0 | 25 3 | 23 3 | 21 9 |
| Ordinary Drys .. .. | 23 0 | 23 0 | 22 3 | 20 9 |
| Best Washed Nuts .. .. | 21 6 | 21 0 | 21 9 | 20 0 |
| Best Washed Peas .. .. | 19 6 | 19 6 | 20 8 | 18 6 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 6 | 21 6 | 18 3 | 17 6 |
| Best Seconds .. .. | 20 6 | 20 9 | 17 9 | 16 9 |
| Ordinary Drys .. .. | 18 6 | 18 6 | 16 9 | 15 9 |
| Best Washed Nuts .. .. | 16 6 | 16 6 | 16 3 | 15 0 |
| Best Washed Peas .. .. | 15 0 | 15 0 | 14 9 | 13 6 |
| Newcastle, f.o.b.— | | | | |
| Best Steams.. .. .. | 15 6 | 15 6 | 15 8 | 12 0 |
| Best Seconds .. .. | 15 3 | 13 0 | 14 0 | 11 0 |
| Smalls .. .. .. | 7 0 | 7 0 | 11 6 | 6 6 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1912-13. | Aggregate. Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine | Dec. 16 | £56,863 | £61,918 | 50 | £2,789,623 | +£203,406 |
| Auckland..... (28 days) | Nov. 21 | 19,174 | 10,497 | 21 | 92,254 | — 4,949 |
| Ballarat and Bendigo | October | 444,6 | 4,366 | 30 | 26,9x8 | — 605 |
| Brazilian St. Rly. Mlrs. | October | 44,563 | 52,219 | 13 | 153,572 | + 26,509 |
| Brazilian Traction..... | Dec. 6 | 84,177 | 95,237 | 49 | 4,419,737 | ... |
| Brisbane ..... | Nov. | 24,810 | 27,053 | 48 | 287,071 | + 55,650 |
| British Columbia .....$ | October | 721,621 | 753,501 | 17 | 3,014,355 | + 279,148 |
| Buenos Aires Pt. & City | October | 6,615 | 7,142 | 43 | 68,109 | + 5,294 |
| Buenos Aires Lacroze... | Nov. | 44,671 | 45,746 | 22 | 225,270 | + 8,901 |
| Calcutta.....Rs. | Dec. 13 | 64,890 | 65,644 | 50 | 32,33,228 | + 1,51,209 |
| Cape Town ..... | Nov. | ... | 12,555 | ... | ... | ... |
| Carthagena & Herrerias | Nov. | 1,703 | 1,923 | 47 | 28,165 | + 4,820 |
| Cordoba..... | October | 12,524 | 13,285 | 30 | 94,628 | + 9,230 |
| East India ..... | Nov. | 1,924 | 1,922 | 17 | 7,833 | + 145 |
| Kalgoorlie..... | Nov. | 2,861 | 2,504 | 48 | 31,603 | — 8,001 |
| La Plata..... | Nov. | 5,210 | 5,409 | 44 | 55,840 | + 9,526 |
| Lima..... | Sept. | 22,660 | 34,110 | 39 | 300,647 | + 23,783 |
| Lisbon ..... Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Dec. 15 | 23,821 | 27,079 | 50 | 613,392 | + 44,791 |
| Melbourne ..... | Nov. | ... | 68,500 | ... | ... | ... |
| Mexico .....$ | Nov. | 565,239 | 605,467 | 48 | 6,387,805 | + 177,861 |
| Montevideo..... | Nov. | 29 623 | 30,530 | 4 | 80,530 | + 907 |
| Para ..... | Dec. 14 | 5,910 | 3,284 | 2 | 6.785 | — 1,266 |
| Port Elizabeth..... | Nov. | ... | 3,530 | ... | ... | ... |
| Shanghai .....$ | Dec. 10 | 20,254 | 23,600 | 49 | 1,111,416 | + 129,652 |
| Singapore .....$ | Dec. 13 | 10,435 | 12,008 | 50 | 597,906 | + 77,504 |
| Toronto .....$ | October | 754,104 | 861,235 | 43 | 8,044,705 | +1,060,557 |
| Winnipeg.....$ | October | 321,039 | 357,313 | 43 | 3,338,748 | + 280,156 |


# DICK, KERR & CO.,

**Limited,**

**ABCHURCH YARD, CANNON STREET,**

**LONDON, E.C.**

**ENGINEERS & CONTRACTORS.**

**Complete Equipment**

**TRAMWAYS & LIGHT RAILWAYS**

**at home and abroad.**


## WEEKLY TRAFFIC RETURNS.

The official traffic returns of 59 of the principal undertakings of the United Kingdom for the week ended December 13 amounted to £214,979, or £7,410 more than in the corresponding week last year, while the track mileage was 2,749, or 75 more than for the corresponding week. The receipts were at the rate of £78 4s. per track mile, an increase of 11s. 6d. per mile as compared with last year.

(*Continued from page* 542.)

## BOROUGH OF PLYMOUTH.

Notice is hereby given that after the expiration of ten days from the date hereof the Corporation intend to enter into contracts for the supply of the following Goods and Materials for one year :—

Schedule No.—3. Section A.—Paints. Section B.—Varnishes. 5. Ironwork. 7. Petroleum Oil. 8. Broomheads. 9. Household Brushes. 11. Iron and Steel. 13. Pitchpine Deals, Flooring, etc. 14. Carbolic Powder. 15. Portland Cement. 16. Lubricating Oils. 17. Tar and Pitch, including refined tar for use in the construction of tarred macadam roads and for tar spraying. 18. Painters' Brushes. 19. Explosives. 22. Soap. 23. Wood Blocks, Soft. 24. Creosote. 27. Road Metal. 28. Disinfectant Fluid (Bacteriological Test). 29. Granite Kerbs, Setts, etc. 30. White Lead, Red Lead, Linseed Oil, and Turpentine. 31. Refilling Machine Revolving Brooms. 33. Benzoline and Motor Spirit. 34. Tools. 35. Indiarubber Goods, Hose, etc. 36. Ship Chandlers' Goods (Sundry Oils, Waste, Grease).

Tenders must be based on the whole of a Schedule (with the exception of Schedules Nos. 3, 4, 22, 29, and 36), and not on any particular item contained therein.

(Separate tenders will be considered for Sections A. and B. of Schedule No. 3.)

Schedules may be obtained on payment of a deposit of £1 in cash for each Schedule. The deposits on the Schedules will be returned, provided *bonâ-fide* tenders are received on or before January 17, 1914. Should the contractor withdraw his tender, or fail to send in one, the amount of his deposit will be forfeited, and the contractor who applies for the Schedules must do so on the distinct understanding that he is willing to abide by the terms of this advertisement.

The lowest or any tender will not necessarily be accepted.

Tenders to be delivered not later than Saturday, January 17, 1914, addressed to the undersigned.

JAMES PATON,
Borough Engineer and Surveyor.

Municipal Offices, Plymouth,
December 21, 1913.

## COUNTY BOROUGH OF SOUTHAMPTON.

TRAMWAY UNIFORMS.

The Corporation invite tenders for the supply of Uniforms for the employees of the Tramways Department.

Form of tender may be obtained and samples inspected at the Manager's Office, 161, Above Bar Street.

Sealed tenders, on the printed form, endorsed "Tender for Tramway Uniforms," must be delivered at the Town Clerk's Office on or before January 2, 1914.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
December 12, 1913.

## POSITIONS VACANT.

### COUNTY BOROUGH OF SUNDERLAND.

DISTRIBUTING SUPERINTENDENT.

Wanted, Superintendent to take charge of underground E.H. Tension and L. Tension Main; one with experience of fault localising and maintenance upon old rubber draw-in system and unbonded lead-sheathed cables on solid system preferred.

Salary £182 per annum rising by increments of £13 per annum to £208.

Applications in own handwriting, stating age, experience, when duties could be commenced, and accompanied by copies of testimonials to be sent to the undersigned as soon as possible.

ALFRED S. BLACKMAN, M.I.M.E., M.I.E.E.,
Engineer and General Manager,
Electricity Offices,
Dunning Street, Sunderland.

### MECHANICAL DRAUGHTSMAN.

Wanted at once, first-class Mechanical Draughtsman, one who understands tramway truck construction. Address at once, stating experience and salary wanted, Anger Manufacturing and Supply Company, Limited, Bank Chambers, Preston.

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Dec. 10 | £1,381 | £1,415 | + £34 | 28 | £46,094 | + £2,966 |
| Accrington Corp. | ,, 10 | 507 | 540 | + 33 | 36 | 20,948 | + 1,982 |
| Ayr Corporation | ,, 13 | 200 | 236 | + 36 | 30 | 12,712 | + 1,825 |
| Bath Electric | ,, 10 | 677 | 721 | + 44 | 50 | 47,703 | + 3,851 |
| Birkenhead Corp. | ,, 14 | 1,174 | 1,259 | + 85 | 37 | 48,016 | + 4,679 |
| Birmingham Corp. | ,, 13 | 11,591 | 12,519 | + 928 | 37 | 436,265 | + 38,485 |
| Blackburn Corporation | ,, 10 | 1,120 | 1,186 | + 66 | 37 | 49,101 | + 4,614 |
| Blackpool Corporation | ,, 11 | 439 | 468 | + 29 | 36 | 75,139 | + 12,061 |
| Bolton Corporation | ,, 14 | 2,540 | 2,711 | + 171 | 37 | 101,669 | + 6,050 |
| Bournemouth Corp. | ,, 17 | 1,550 | 1,626 | + 76 | 37 | 80,536 | + 9,483 |
| Bradford Corporation.. | ,, 13 | 5,496 | 5,994 | + 508 | 36 | 220,300 | + 14,140 |
| Brighton Corporation | ,, 14 | 794 | 821 | + 27 | 37 | 42,246 | + 2,989 |
| Bristol | ,, 12 | 6,774 | 6,923 | + 149 | 49 | 396,497 | + 52,526 |
| British Elec. Federa'n. | ,, 12 | 38,551 | 44,325 | * | ... | ... | ... |
| Burnley Corporation .. | ,, 13 | 1,553 | 1,633 | + 80 | 37 | 63,359 | + 7,321 |
| Burton-on Trent Corp | ,, 14 | 270 | 292 | + 22 | 37 | 10,820 | + 561 |
| Bury Corporation | ,, 14 | 1,227 | 1,255 | + 28 | 37 | 50,387 | + 2,137 |
| Cardiff Corporation | ,, 6 | 2,343 | 2,652 | + 309 | 36 | 99,087 | + 10,830 |
| Chatham and District.. | ,, 11 | 818 | 850 | + 32 | 49 | 45,641 | + 2,959 |
| Chesterfield Corp. | ,, 11 | 237 | 248 | + 11 | 36 | 9,205 | + 1,153 |
| Colne & Trawden | ,, 13 | 252 | 237 | — 15 | 50 | 13,638 | + 816 |
| Cork Electric | ,, 11 | 449 | 474 | + 25 | 49 | 24,680 | + 740 |
| Croydon Corporation .. | ,, 5 | 1,619 | 1,566 | — 53 | 35 | 59,397 | — 5,757 |
| Darlington Corporation | ,, 13 | 221 | 231 | + 10 | 37 | 9 239 | + 891 |
| Derby Corporation | ,, 13 | 878 | 898 | + 20 | 37 | 36,566 | + 3,096 |
| Dover Corporation | ,, 13 | 189 | 182 | — 7 | 37 | 9,456 | + 190 |
| Dublin & Lucan | ,, 12 | 109 | 118 | + 9 | 23½ | 3,471 | — 5 |
| Dublin United | ,, 12 | 5 578 | 5,161 | — 417 | 49 | 270,374 | — 16,291 |
| Dundee City | ,, 10 | 1,144 | 1,208 | + 64 | 30 | 39,584 | + 3,082 |
| East Ham Corporation | ,, 13 | 1,051 | 998 | — 53 | 37 | 37,869 | — 1,697 |
| Exeter Corporation | ,, 12 | 291 | 300 | + 9 | 37 | 12,935 | + 677 |
| Gearless Mo'or 'Buses. | ,, 13 | ... | 492 | ... | 36 | 17,944 | ... |
| Glasgow Corporation | ,, 13 | 19,317 | 20,643 | + 1,326 | 28 | 569,308 | + 43,488 |
| Glossop(U.Elec.Supply) | ,, 13 | 127 | 118 | — 9 | 50 | 6,453 | + 586 |
| Halifax Corporation | ,, 9 | 1,838 | 1,840 | + 2 | 36 | 77,600 | + 2,944 |
| Hastings & District | ,, 11 | 684 | 719 | + 35 | 50 | 51,614 | + 3,814 |
| Huddersfield Corp. | ,, 13 | 2,015 | 1,990 | — 25 | 37 | 79,023 | + 4,724 |
| Hull Corporation | ,, 13 | 3,101 | 3,121 | + 20 | 37 | 116,309 | + 6,284 |
| Ilford U.D.C. | ,, 13 | 417 | 419 | + 2 | 37 | 16,778 | — 883 |
| Ilkeston Corporation .. | ,, 17 | 113 | 122 | + 9 | 38 | 5,667 | + 781 |
| Ipswich Corporation .. | ,, 13 | 371 | 368 | — 3 | 37 | 17,415 | + 754 |
| Isle of Thanet | ,, 13 | 276 | 294 | + 18 | 11 | 4,110 | + 484 |
| Kilmarnock Corp. | ,, 13 | 160 | 162 | + 2 | 30 | 5,869 | + 377 |
| Lanarkshire | ,, 11 | 1 531 | 1,731 | + 200 | 49 | 84,669 | + 11,067 |
| Lancashire United | ,, 10 | 1,293 | 1,484 | + 191 | 49 | 76,749 | + 9,652 |
| Leeds City | ,, 6 | 7,499 | 8,070 | + 571 | 36 | 296,887 | + 19,202 |
| Leicester Corporation.. | ,, 13 | 2,676 | 2,720 | + 54 | 50 | 140,020 | + 12,592 |
| Leith Corporation | ,, 13 | 619 | 638 | + 19 | 30 | 21,798 | + 1,087 |
| Leyton U.D.C. | ,, 4 | 1,183 | 1,289 | + 106 | 35½ | 48,126 | + 426 |
| Liverpool Corporation.. | ,, 13 | 12,619 | 13,091 | + 472 | 50 | 642,779 | + 47,979 |
| Llandudno & Colwyn B. | ,, 12 | 133 | 144 | + 11 | 9 | 251 | + 17 |
| London County Council | ,, 10 | 41,934 | 42,782 | + 848 | 96 | 1,533,353 | + 4,985 |
| London Gnl. Omnibus.. | ,, 13 | 57,308 | 60,161 | + 2,853 | 50 | 3,088,784 | + 312,377 |
| London United | ,, 12 | 5.511 | 5,536 | + 25 | 50 | 312,789 | + 6,715 |
| Lowestoft Corporation | ,, 13 | 176 | 159 | — 17 | 10 | 2,038 | + 155 |
| Maidstone Corporation | ,, 11 | 158 | 170 | + 12 | 37 | 7,700 | + 575 |
| Manchester Corp. | ,, 13 | 17,084 | 17,617 | + 533 | 37 | 652,559 | + 33,339 |
| Met. Elec. Trys. | ,, 12 | 8,629 | 8,573 | — 56 | 50 | 450,464 | + 15,495 |
| Nelson Corporation .. | ,, 13 | 193 | 176 | — 17 | 37 | 7,810 | + 438 |
| N'castle-on-Tyne Corp. | ,, 13 | 5,081 | 4,971 | + 110 | 37 | 180,805 | + 16,531 |
| Newport (Mon.) Corp. | ,, 6 | 678 | 760 | + 82 | 36 | 27,821 | + 2,336 |
| New St. Helens & Dist. | ,, 10 | 713 | 769 | + 56 | 24 | 20,123 | + 2,156 |
| NorthamptonCorp | ,, 12 | 492 | 515 | + 23 | 37 | 21,454 | + 1,464 |
| Nottingham Corp. | ,, 11 | 3,182 | 3,256 | + 74 | 36½ | 123,283 | + 5,779 |
| Oldham Corporation .. | ,, 14 | 1,979 | 2,163 | + 184 | 38 | 84,203 | + 6,141 |
| Portsmouth Corp. | ,, 13 | 1,755 | 1,957 | + 202 | 37 | 86,606 | + 6,234 |
| Preston Corporation .. | ,, 10 | 768 | 796 | + 28 | 37 | 32,860 | + 2,173 |
| Provincial | ,, 13 | 1,602 | 1,703 | + 101 | 10 | 18,364 | + 1,343 |
| Reading Corporation .. | ,, 11 | 648 | 662 | + 14 | 36 | 25,666 | + 2,038 |
| Rochdale Corporation | ,, 13 | 1,451 | 1,472 | + 21 | 37 | 59,784 | + 2,652 |
| Rotherham Corp. | ,, 17 | 870 | 1,004 | + 134 | 37 | 37,368 | + 8,446 |
| Salford Corporation .. | ,, 15 | 5,022 | 5,262 | + 240 | 37 | 194 902 | + 8,406 |
| Sheffield Corporation.. | ,, 14 | 7,226 | 7,526 | + 299 | 38 | 277,447 | + 22,533 |
| Southampton Corp. | ,, 10 | 1,118 | 1,199 | + 81 | 36 | 49,081 | + 3,333 |
| Southend-on-Sea Corp. | ,, 10 | 533 | 650 | + 117 | 37 | 36,576 | + 6,421 |
| South Met. Trys. | ,, 12 | 752 | 1,050 | + 298 | 50 | 47,400 | + 5,681 |
| South Shields Corp. | ,, 13 | 641 | 653 | + 12 | 37 | 26,747 | + 3.277 |
| Sunderland Corp. | ,, 14 | 1,256 | 1,345 | + 89 | 37 | 53,792 | + 5,366 |
| Sunderland District .. | ,, 10 | 525 | 527 | + 2 | 6 | 3.316 | + 414 |
| Swindon Corporation .. | ,, 10 | 151 | 156 | + 6 | 36 | 6,116 | + 408 |
| Trys. (M.E.T.) 'Buses | ,, 13 | ... | 8,755 | ... | 46 | 257,212 | .. |
| TynesideTrys.&Tmrds | ,, 10 | 638 | 446 | — 192 | 24 | 12,438 | + 599 |
| Wallasey Corporation | ,, 13 | 1 026 | 1,089 | + 63 | 37 | 45,766 | + 4,310 |
| Walsall Corporation .. | ,, 13 | 641 | 641 | + 20 | 50 | 31,175 | + 2,240 |
| Walthamstow U.D.C .. | ,, 13 | 641 | 700 | + 59 | 37 | 27,782 | + 1,093 |
| Warrington Corp | Nov. 27 | 438 | 458 | + 20 | 35 | 15,018 | + 502 |
| West Ham Corporation | Dec. 11 | 2,558 | 2 648 | + 90 | 36 | 99,792 | + 3,990 |
| Wigan Corporation | ,, 11 | 1,391 | 1,460 | + 69 | 36½ | 54,580 | + 5,468 |
| Wolverhampton Corp | ,, 17 | 1,032 | 1,068 | + 36 | 38 | 40,796 | + 2,257 |
| Yorkshire (W. Riding | ,, 14 | 1,257 | 1,293 | + 36 | 50 | 72,247 | + 7,428 |

* From such of the services as were working both last year and this year the receipts show a decrease of £4,554 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Dec. 13 | £5,795 | £5,370 | — £425 | 50 | £244,175 | + £14,678 |
| City and South London | ,, 13 | 3,227 | 2,918 | — 309 | 50 | 139,184 | — 13,241 |
| Liverpool Overhead | ,, 14 | 1,595 | 1,742 | + 147 | 50 | 85,686 | + 6,480 |
| London Electric | ,, 13 | 14,890 | 14,820 | — 70 | 50 | 683,690 | + 900 |
| Mersey | ,, 13 | 2,223 | 2,186 | — 37 | 50 | 111,438 | + 4,562 |
| Metropolitan | ,, 14 | 17,008 | 18,346 | + 1 338 | 50 | 864,401 | + 32,498 |
| Metropolitan District | ,, 13 | 13,107 | 13,432 | + 325 | 50 | 649,760 | + 18,270 |

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For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

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Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, December 19. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 72 — 75 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | + ⅛ | 4⅛ — 4¼ |
| 5 | Do. 5½% Cum. 2nd Pref. | ... | 4⅛ — 4¼ |
| 100 | Do. 4% Deb. Stk. Red. | ... | 90 — 92 |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 97½ — 99½ |
| 100 | Do. 5% Deb. Stk. Red. | + ½ | 97 — 99 |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 101½ — 103½ |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | ⅞ — 1 |
| 1 | Do. 5% Cum. Pref | ... | ⅞ — 1 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| | Bombay Elec. Supply and Trams. Co., Ord. | ... | 12 — 13 |
| 10 | Do. do. 6% Cum. Pref. | ... | 10¾ — 11½ |
| 100 | Do. do. 4½% Db. Stk Rd. | ... | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | — 2½ | 84½ — 86½ |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¾ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 — 101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5½ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 6¼ — 6¾ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 — 103 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 1 | 110 — 114 |
| 100 | Do. Pref. Ord. Stock | ... | 102 — 106 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | ... | 102 — 105 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 98 — 101 |
| 4£ | Do. 4½% Vancouver Power Debs. | ... | 100 — 104 |
| 100 | Do. 4½% Perpetual Cons. Deb. Stk. | ... | 92 — 95 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | ... | 84 — 87 |
| 10( | Do. 7% Non-Cum. Pref. | ... | 53 — 55 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | + ⅛ | 10⅛ — 12⅛ |
| 100 | Do. Deferred Ord. Stock | ... | 4 — 5⅛ |
| 10( | Do. 5% Perpetual Debenture Stock | ... | 92 — 95 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 77 — 80 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | — 2½ | 84 — 89 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited. Ord. | ... | 5⅞ — 6⅛ |
| 5 | Do do. 5% Cum. Pref. | ... | 4⅛ — 5⅜ |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | — 1 | 95 — 98 |
| 1 | Cape Electric Tramways, Ltd. | ... | ⅞ — ⅞ |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 100 | Do. 5% Debs., Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5¼ — 5⅛ |
| 100 | Do. 4% Debenture Stock Red, 1935 | ... | 93 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 89 — 92 |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | + ⅛ | — 10½ |
| 10 | Do. do. 6% Pref. | ... | — 12 |
| 100 | Do. do. "A" Red. | ... | — 78½ |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 77 |
| 10 | Gateshead & Dist Trys. Co., Ord. | ... | 9 — 9½ |
| 10/ | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | ⅝ — ¾ |
| 1 | Do. do. 6% Cum. Pref. | ... | ⅝ — ¾ |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 84½ — 89½ |
| 10 | Imperial Tramways, Ord. | ... | 3½ — 4½ |
| 10 | Do do. 6% Cum. Pref. | ... | 6½ — 6¾ |
| 10( | Do do. 4½% Deb. Stock | ... | 76½ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref. | ... | 2 — 2¼ xd |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — ⅛ |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 xd |
| 10( | Do. do. 6% "B" do. | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | ⅞ — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Do. 6% Cum. Pref. | ... | ⅞ — 1⅛ |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | .. | ⅝ — ⅝ |
| 100 | London General Omnibus Company, Limited. 4½% Deb. | ... | 96 — 98 |
| 100 | Do. Do 5% Cum, Inc. Deb. Stk. Red. | ... | 86 — 88 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 59 — 63 |
| 10( | Madras Electric Trams. (1904), Lim., 6% Cum. Pref. | ... | 4⅞ — 5¼ |
| 5 | Do. do. 5% Deb. Stk., Red. | ... | 101 —103 |
| 10( | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | — 2½ | 81 — 84 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 107 —110 xd |
| $1,000 | Do. do. 5% Bds. | ... | 98½ — 98½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | ⅞ — 1 |
| 100 | Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. | ... | 82 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| 100 | Mexico Tramways Co.. Common Stock | — 7 | 71 — 74 |
| 500 | Do. Gen. Con. 1st Mort. Gld. Bonds | — 4 | 77 — 82 |
| 100 | Do. 6% 50-yr. Mort. Bonds | — 4 | 78 — 81 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | ... | 91 — 93 |
| 10( | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 99 —101 |
| 10( | Do. 4½% Sterling Debs, (1932) | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd | ... | ⅜ — 1⅛ |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 5⅞ — 6⅛ |
| 10 | Do. do. 5% Cum. Pref. | ... | 5⅞ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 5¾ — 6¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ |
| 1 | Perth (W.A.) Elec. Trams.. Ld., Ord. | ... | 1⅝ — 1¾ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | ⅞ — ⅞ |
| 1 | Do. 5% Cum. Pref. | ... | ⅞ — 1 |
| 10( | Do. 4½% Debenture Stock, Red. | ... | 84 — 87 |
| 1 | Provincial Tramways. Lim., Ord. | ... | ⅔ — ⅔ |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 83 — 85 |
| 5 | Rangoon Elec Trams. & Supply Co., 6% Cum. Pref. | ... | 5½ — 5⅝ |
| 10( | Do. do. 4½% 1st Mt. Db. Stk | — ½ | 96½ — 98½ |
| 10( | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 84 — 87 |
| $50( | Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds. | — ½ | 99½ —101½ |
| 100 | Do. do. 5% 50-yr. Mort. Gold Bonds | ... | 90 — 92 |
| $50( | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 97 —100 |
| 10 | Do. 5% 1st Mort. Debs., Red., 1939 | ... | 100 —103 |
| 10( | Shanghai Elec. Construction Co. | ... | 10 — 11 |
| 10( | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 88 — 90 |
| 100 | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | ⅝ — ¾ |
| 10( | Do. do. 4% Deb. Stk. | ... | 68 — 72 |
| .. | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co.. 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 84½ — 86½ |
| 10( | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | — ⅛ | 4⅝ — 5 xd |
| 5 | Do. do. 6% Cum. Pref. | ... | 4¾ — 5⅛ xd |
| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96½ |
| 100 | Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb. | ... | 95 — 97 |
| 5 | Yorkshire (West Riding) Elec. Trys. Co., Ord. | ... | ⅜ — ⅝ |
| 5 | Do do. 6% Cum. Pref. | ... | 3½ — 4 |
| 10( | Do. do. 4½% 1st Deb. Stock. Red. | ... | 81 — 86 |

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THE

# Tramway & Railway World

Vol. XXXIV. No. 32. | LONDON, SATURDAY, DECEMBER 27, 1913. | [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

## NOTICES.

**Owing to the Christmas Holidays this issue is printed on Tuesday evening, consequently market quotations given on page 556 are the closing prices for Tuesday.**

**All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.**

**The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.**

**Telegrams: "TRAMIGRO, LONDON."**
**Telephone: No. 2948 GERRARD.**

# WEEKLY LIST OF TENDERS INVITED.

## CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

The Tramways Committee are prepared to receive tenders for the supply of Stores as set forth in the following Schedules, during the year ending March 31, 1915:—

Schedule No.
1 Glass.
2 Iron and Steel.
3 Leather and Rubber Goods.
4 Cotton Waste, White Rags, and Sponges.
5 Paint, Varnishes, etc.
6 Springs.
7 Electrical Sundries.
8 Oils, Greases, etc.
9 Chemist's Sundries.
10 Iron and Steel Castings.
11 Malleable Iron Castings.
12 Insulating Materials.
13 Paint and other Brushes.
14 Files.
15 Ironmongery.
16 Bolts and Nuts, Washers, etc.

Conditions of contract and form of tender may be obtained on application to the undersigned.

The tender, filled up as directed, must be enclosed in a sealed cover, addressed to the Chairman of the Tramways Committee, and endorsed in the left-hand corner, and delivered to the Tramways Offices, The Council House, Congreve Street, Birmingham, not later than 12 o'clock noon on Monday, the 26th day of January, 1914.

ALFRED BAKER,
General Manager.

Tramways Offices,
The Council House,
Congreve Street, Birmingham.

## CORPORATION OF EDINBURGH.

TO MOTOR OMNIBUS BUILDERS.

TENDERS FOR MOTOR OMNIBUSES.

The Magistrates and Council are prepared to receive tenders for the supply and delivery of Motor Omnibuses not exceeding six.

General description, specification, conditions of contract, sketch drawings, and forms of tender, together with any other information, may be obtained from Mr. A. Horsburgh Campbell, M.Inst.C.E., Engineer, Parliament Square, on payment by crossed cheque of £2 2s. deposit, which will be returned on the receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tender Motor Omnibuses," and addressed to the undersigned, to be delivered not later than 10 a.m. on Wednesday, January 7, 1914.

The Magistrates and Council do not bind themselves to accept the lowest or any tender.

THOMAS HUNTER, W.S.,
Town Clerk.

City Chambers, Edinburgh,
December 17, 1913.

## THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

STORES.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

| | |
|---|---|
| Cranked Fishplates. | Tie Bars, Gibs, and Cotters. |
| Steel Rails and Fishplates. | Rail Lifters. |
| Points and Crossings. | Brass Strips, Angles, etc. |
| Steel Fishbolts, etc. | Canvases. |
| Cast Iron Sleepers. | Carriage Fittings. |

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes sealed and addressed to the undersigned, marked "Tender for Cranked Fishplates," or as the case may be, not later than 11 o'clock a.m. on Thursday, January 1, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.,
December 22, 1913.

## COUNTY BOROUGH OF WEST HAM.

TRAMWAY TICKETS.

The Council hereby invite tenders for the supply of Tramway Tickets.

Specification and form of tender may be obtained at the Office of Mr. J. S. D. Moffet, Tramways Manager, Greengate Street, Plaistow, London, E., upon payment of £1, which will be returned upon receipt of a *bonâ-fide* tender.

Note.—No tender will be considered unless the same is delivered at the Office of the Town Clerk, Town Hall, West Ham, E., in the envelope supplied, by Registered Post, not later than 12 o'clock noon on Tuesday, January 6, 1914.

The Council do not bind themselves to accept the lowest or any tender. The contractor will be required to enter into a bond, with one surety, for the due performance of the contract.

The contractor whose tender is accepted, and with whom a contract is entered into, will be required to pay to the whole of his workmen such rate of wages, and observe such hours of labour as are recognised by the Workmen's Trades Unions, and shall not assign, nor underlet, or make a sub-contract with any person or persons for the execution of any part of such work. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

By order of the Council,

H. W. GREAVES,
Town Clerk.

Town Hall, West Ham, E.,
December 19, 1913.

## COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for Weldless Steel Pipes for feeding Boilers.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Five shillings will be charged for extra copies of specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Steel Pipes," and delivered not later than 12 o'clock noon on Wednesday, January 7, 1914.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS, M.I.E.E.,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

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## COUNTY BOROUGH OF SWANSEA.

ELECTRICITY DEPARTMENT.

The Corporation of Swansea invite tenders for one or two years' supply and delivery of :—

(*a*) Motors.
(*b*) Starting Switches.

Copies of the general conditions, specifications and forms of tender can be obtained on and after Tuesday next, the 23rd instant, from Mr. C. A. L. Prusmann, Borough Electrical Engineer, on payment of one guinea for each specification, which amount will be returned on receipt of a *bonâ-fide* tender. Additional copies of the specification can be obtained at 5s. per copy, which amount will not be returned.

Sealed tenders, endorsed "Motors," or/and "Starting Switches," to be delivered at my offices not later than noon on Thursday, January 8, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

H. LANG COATH,
Town Clerk.

Guildhall, Swansea.

## COUNTY BOROUGH OF HALIFAX.

TENDERS FOR TROLLEY WIRE.

The Tramways Committee of the Halifax Corporation invite tenders for the supply of 10 Miles of Trolley Wire. Full particulars may be obtained on application to the Tramways Engineer, Skircoat Depôt, Halifax. Tenders, endorsed "Trolley Wire," must be sent to the undersigned not later than Wednesday, December 31, 1913. The person whose tender is accepted will be required to observe the Fair Contracts Clauses adopted by the Corporation. The Committee do not bind themselves to accept the lowest or any tender.

By Order, PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax,
December 19, 1913.

## POSITION WANTED.

### TRAMWAY MOTORMAN.

Tramway Motorman (Scotch), thoroughly experienced, desires change to some English tramway system. Would like situation as motorman on electric railway system. Abstainer. 25. No. 33, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.


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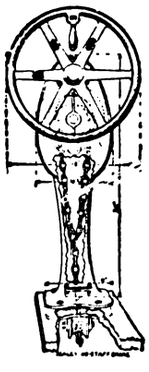
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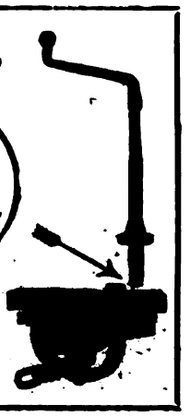


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THE
# Tramway AND Railway World

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*THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,*
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**One Shilling per Single Copy.**

**FOR ALL PLACES ABROAD—Thirty Shillings per Annum.**

SATURDAY, DECEMBER 27, 1913.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS.

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

## TRAILER CARS.

There is at length a prospect of a large development of the use of trailer cars on tramways in this country. In the days of steam tramway trains consisting of a locomotive hauling a car were commonly in use, but when electric traction began the trailer arrangement very soon disappeared. Perhaps one of the reasons for this was that the steam tramway in any shape was somewhat disagreeable, and the associations connected with a steam engine hauling another car were perhaps sufficient to discourage the spread of a method whereby an ordinary electric car would pull another car, the latter of which would not be provided with anything in the way of motors. The Board of Trade always profess to be willing to consider applications from tramway authorities for leave to use trailers, and each case is considered on its merits in the light of the local circumstances. As a matter of fact, however, the Board of Trade have been very chary in granting such permission, and even where it has been granted the running of trailer cars seems to have been in most cases discontinued. Perhaps the most notable example in past years of the use of trailer cars on an electric tramway was in Leeds, where highly satisfactory financial results were obtained, owing to the fact that while the trailer car could accommodate almost as many people as the motor car, its use did not add very considerably to the working expenses. That is to say, if the cost of running the ordinary cars was, say, 7d. per car mile, the cost per train mile for a motor car and trailer car might be approximately 11d. or 1s. at the outside. The trailer car can, of course, be built very light, as it has to withstand no driving stresses and carries practically no mechanism except that for the brakes. The problem of dealing with the enormous traffic at the rush hours in London led to the subject of trailer cars being revived there two or three years ago, and the London County Council obtained the authority of the Board of Trade to run a few two-car trains experimentally. The Commissioner of Metropolitan Police, however, after a few months vetoed the experiment, and it was found impossible to run trailer cars in London until an Act of Parliament was obtained giving authority to do so. In the session of 1912 the County Council sought such powers in their Tramway Bill of that year, and while the measure was pending we published in these columns a series of letters from Continental tramway managers showing the great advantages experienced abroad from the use of two-car trains. In spite of the opposition of the Metropolitan Police, Parliament granted the County Council the desired authority so far as the southern system of tramways was concerned, and subject to the approval of the Board of Trade. After a little experimental running in the south-east of London trailer cars were last summer put on the route between Victoria Embankment and Tooting. These trailer cars, eight in number, have proved of enormous advantage on this route, which is one of the most heavily loaded in the Metropolis. The trailers are simply old horse cars which have been adapted for the purpose. The Board of Trade appear to be satisfied with the arrangement as to couplers and brakes, while the public have the advantage that a motor car and trailer together can seat 120 or 130 people. Now the announcement comes that the County Council are about to invite tenders for the construction of 150 new trailer cars, so that the advantage of running two-car trains may be extended over a large proportion of the southern tramways. Once all these cars are running quite a new era will be opened in tramway transportation in South London, and it may even be found practicable during the busiest hours to run the trains at slightly longer intervals than has been necessary when using single cars. This, of course, would reduce traffic congestion while giving the fullest accommodation for passengers. The use of trailer cars now promises to extend in various towns. In Birmingham the Tramways Committee hope soon to have a number of trailer cars running. Probably with a view to avoid any uncertainty as to getting the consent of the Board of Trade, four tramway authorities are seeking statutory powers in the coming session of Parliament to run trailer cars. These are the London United Tramways Company, Bolton Corporation, Newcastle-on-Tyne Corporation, and Walsall Corporation. In addition to the great economy arising from the use of trailers it has always to be remembered that they enable the management to cope with enormous rushes of traffic with which it is impossible to deal satisfactorily with single cars.

## TRAFFIC IMPROVEMENT.

The great improvement in the receipts of the London County Council tramways provides an indication of what can be done in the way of traffic promotion by careful study of a particular situation. There is no universal rule by which a public transport undertaking can build up a business. Each case must be considered by itself, and dealt with in relation to the local circumstances. Painstaking and constant observation and experiment will, however, bring about an improvement even in the most unpromising conditions. The traffic manager and his assistants cannot be too often on the lines, for only by personal inspection of the traffic, the habits of the people,

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and the way in which the existing service meets, or fails to meet, the public requirements can a service be better adapted to secure all the available traffic. Aside from the institution of new or special services, and a change of routes or schedules, which will from time to time be desirable, there is always an opportunity for increasing the regular and punctual running of the cars. Where these are habitually faulty something is wrong and needs attention. It is not enough to allege, for instance, that a line is a particularly difficult route to work; that at certain parts it is congested; and that the service must in consequence be imperfect. There are ways of improving even the most awkwardly situated route. There are lines on which not infrequently two or three cars pass in one direction without a car on the opposite track coming in sight. Irregularity such as this in time becomes irritating, and passengers are taught by painful experience that pedestrianism is a surer if slower mode of progression than the tramway service. The number of fares thus lost on lines where the service is poor amounts to an appreciable sum in a week; and in many cases we are convinced that more careful inspection of car services would bring about marked improvement. Constant watchfulness will accomplish much that at first sight seems impracticable. "Difficulties exist only to be overcome," was the constant retort of a chief to whom juniors came making complaint that some obstacle prevented the carrying out of new plans. That rejoinder in time created an attitude of mind which was invaluable as an incentive throughout the undertaking. As a working hypothesis nothing could be better, and it may be commended to traffic departments of any of our tramways where there is a tendency to let matters fall into a rut, or to look at improvement as impracticable.

## MERIT RANK SCHEME FOR NOTTINGHAM EMPLOYEES.

Approval has been given by Nottingham Tramways Committee to a merit rank scheme for drivers and conductors, in lieu of the bonus system to which the employees had objected. The new scheme was prepared by Mr. J. Aldworth, the general manager, and it also had the careful consideration of Councillor R. H. Swaine, the chairman of the committee. Appended are the details of the scheme:—

The men will be enabled to gain the right of wearing stripes on their uniform—one stripe for the third class grade, two stripes for the second class, and three stripes for the first class.

Each stripe carries with it payment at the rate of 1s. per week for the time worked, subject to certain conditions specified below:—

(1) That such merit grades, and the weekly payments attaching, shall be continued and remain in force only at the discretion of the Tramways Committee.

(2) That the payment of these weekly amounts shall not be considered part of an employee's wages, but only as a reward for meritorious service.

(3) That no employee shall qualify for merit rank by length of service alone, as the promotion will also depend upon the following qualifications having been reasonably observed:—

(*a*) Civility and attention to passengers.
(*b*) Freedom from blameable accidents.
(*c*) Cleanliness of person and uniform.
(*d*) Showing up for duty at schedule time.
(*e*) Keeping a good look-out for passengers.
(*f*) Careful running and working of car.
(*g*) Economy in use of electrical energy.
(*h*) Careful observance of rules and regulations.

(4) Should a motorman or conductor holding merit rank render himself unworthy by breach of discipline, careless working, or general misconduct, he may be deprived of one or more stripes with the weekly payments attaching, for such a period as the circumstances of the case may be considered to warrant; but in the case of an employee not in possession of a stripe, it may be met by deferring promotion to merit rank for such a period as may be deemed necessary or advisable.

(5) That promotion to merit rank for which a motorman or conductor may become eligible shall not be withheld, nor shall promotion to either grade be cancelled, without the reasons for such action being stated by the general manager, and an opportunity given for laying before him either personally or in writing, as the employee may prefer, any explanation he may have to make, or reason to advance why promotion should not be withheld or cancelled as the case may be.

(6) Should a motorman or conductor consider his case has not been fairly dealt with he shall have the right to appeal to the Tramways Committee, notice of which must be given to the General Manager in writing.

(7) That to be eligible for promotion to the third class grade, an employee must have been continuously in the service of the Tramways Committee as a full-time motorman or conductor for a period of three years.

(8) For promotion to second class grade, he must have been continuously in the service for a further period of five years.

(9) Before becoming eligible for promotion to the first class grade, he must have continued in the service for a still further period of five years.

(10) That these various periods shall commence from the time an employee is appointed to a full service, including holiday reliefs and the working alternately as conductor and motorman.

(11) That it shall be within the discretion of the Tramways Committee to appoint to merit rank, or promotion to a higher grade, any employee who by special service may, in the opinion of the Committee, be so deserving, irrespective of the period he may have been in the service of the department.

It is proposed that the scheme shall take effect early in 1914.

## OXFORD OMNIBUS DIFFICULTY.

By a majority of 21 the Oxford City Council have defeated, for a second time, a motion instructing the city solicitor to issue a writ to recover damages due from the Tramways Company and the National Electric Construction Company under the Acts of Parliament and other documents relating to the Oxford tramways. On December 15, the Town Clerk informed the Council that a memorial in favour of the omnibuses had been received which bore upwards of fourteen thousand signatures. Application had also been received from several companies for licences to run 'buses. A report was presented from the Parliamentary Committee recommending that steps be taken to obtain an injunction restraining the Oxford Motor Omnibus Company and their manager from running omnibuses within the city of Oxford without first obtaining a licence. The city solicitor said that he had consulted Mr. Macmorran, K.C., who gave it as his opinion that the Tramway Acts did not in any way interfere with the right and duty of the Corporation to consider upon its merits every application for an omnibus licence, and to grant such licence in every case in which they considered it was to the public advantage to do so. The Corporation might, if they wished, state that they were prepared to consider applications for licences and to decide each case upon its merits. The matter was referred to the Council in committee.

Messrs. Tilling, Limited, have offered to run a service of petrol-electric vehicles, and to make a payment for the privilege. On December 18, the Watch Committee agreed to recommend that five licences each be granted to the three companies who had made application, namely, Messrs. Tilling, Limited, Mr. Cownie, of the National Electric Construction Company, and Mr. Morris, of the Oxford Motor Omnibus Company. Prior to the meeting of the committee twelve omnibuses were drawn up for inspection outside the Municipal Buildings, the vehicles comprising eleven sent by Mr. Morris and one by Messrs. Tilling. No inspection was made by the police, however, and after some delay the vehicles were removed. On the same day Mr. Morris started a service of eleven omnibuses to all parts of the city, and he stated that he looks upon the proposal to license five omnibuses of each company as quite an impossible one. So far as he is concerned he says that "it will be twelve or nothing, because it would not pay to run merely half a dozen." "I am determined," he added, "to fight the matter to an end."

## WHERE FREE PASSES ARE GRANTED.

A report has been presented to the Brighton Tramways Committee by Mr. W. Marsh, the engineer and manager, on the information he had gathered from other towns on the question of tramway passes for members of the Corporation. West Ham and Southend were the only undertakings that issue free passes to all members of the Council. In Aberdeen passes were granted between members' houses and the municipal buildings; in Bournemouth half the cost of the members' annual tickets was paid by the Corporation, and in Sheffield and Liverpool passes were granted to members of the Tramways Committees only. In eleven other towns passes were granted to the Chairman of the Tramway Committee, and in some of these towns passes were also issued to the Mayor and Vice-Chairman of the Tramways Committee. In Stockport the Tramways Committee had relinquished the passes owing to adverse criticism.

At the meeting of the Brighton Council on December 18, the Tramways Committee recommended that no action should be taken in the matter. Councillor Yates, however, proposed that free passes be granted to the members of the Council on the understanding that such passes would only be used when the members were travelling on Corporation business. On two previous occasions the exception to this resolution had been carried by the Mayor's casting vote. In the course of the discussion, the opinion was expressed that if the resolution was passed it would open the door to other local bodies and officials to apply for concessions. Councillor Yates mentioned that the members of the Track Sub-committee had a pass for doing special work in connection with the department. There were seventeen towns which gave some special facilities to Council members, although there were only two in which every member of the Council had a special pass. The motion was defeated by 27 votes to 14.

**Reduced Assessment of London Tramways.**—Report has been made to the London County Council by the Local Government, Records, and Museums Committee that in connection with the falling off in the tramway receipts owing to motor omnibus competition action taken had resulted in reductions being obtained in assessment of the tramways in nearly all the metropolitan boroughs affected. In the case of Islington an application had to be made to the High Court for the purpose of getting a valuation list made, and the Divisional Court on December 2 made a rule absolute, the order being for a writ of mandamus to the Assessment Committee to appoint a person to make a list. Notice of appeal had been given, and the Committee obtained authority to take the necessary steps for protecting the Council's interests. In regard to the borough of Bethnal Green, it was proposed that an appeal should be lodged at quarter sessions against the supplemental valuation list. The borough of Hammersmith had refused to appoint a person to make a provisional valuation list, and it was agreed that the same action should be taken as in the case of the borough of Islington.

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# MISCELLANEOUS NEWS AND NOTES.

**The Skefko Ball Bearing Company, Limited,** of Luton, have removed their London office to 28, Victoria Street, Westminster, S.W.

**The Leeds Strike.**—While the tramwaymen, with the exception of power station hands, have returned to work, the men of other departments are holding out for complete reinstatement.

**Our Present Issue.**—On account of Christmas Day occurring on Thursday, this issue is published on December 24. Consequently the majority of the Traffic Returns are those from the issue dated December 20.

**Unusual Occurrence.**—It is stated that owing to the sudden application of the emergency brake of a car at Snow Hill, Handsworth, on December 13, a rod was forced through the floor of a vehicle, causing injuries to the legs of two passengers.

**Season Ticket Question.**—By 21 votes to three Perth Council have instructed the Tramways Committee to prepare a report on the subject of season tickets. The committee, by seven votes to six, had rejected a motion in favour of such tickets.

**Christmas Day at Hull.**—As after five o'clock on Christmas Day the traffic is of very small volume, Mr. W. J. McCombe, the tramways manager, has announced that the committee have decided that the tramways traffic shall cease at five p.m.

**Improved Conditions for London United Tramwaymen.**—The London United Tramways Company announce an increase of pay, from 4s. 6d. to 5s. per day, to their conductors, after January 1. In addition the men will obtain improved conditions affecting the rest day.

**Wind Screens at Darwen.**—The Tramways Committee of the Darwen Corporation tramways have sanctioned the use of the wind screen, designed by the general manager, Mr. F. J. S. Hosken, on ten open cars. The top portion of the screen provides space for advertisements.

**Scottish Light Railway Scheme.**—The Association for the Development of the Counties of Aberdeen, Kincardine, and Banff have made an application to the Development Commissioners for a grant towards the cost of constructing a light railway from Alford to Strathdon at a cost of £94,000 for wide gauge or £68,900 for narrow gauge.

**A Summons for Carrying a Drunken Passenger.**—A tramcar conductor was summoned by the Metropolitan Police at Tottenham for failing to put a drunken man off his car. Defendant, who was fined 20s., denied that the man to his knowledge was drunk and said the vibration of the cars often upset people and made them appear unsteady.

**Numerals for Bristol Services.**—In consequence of the increase in the tramcar and omnibus services the Tramways Company have decided to number the vehicles according to routes. The tramcars, in addition to having the indicator at each end naming the termini, will be furnished with a service number, up to 17. Similarly the motor omnibuses will bear figures from 18 to 32.

**A Huddersfield Extension.**—The Corporation have completed the tramway extension from Birchencliffe to Elland. A mile has been laid with double track and half a mile with single track. The rails were welded by Thermit, Limited. Rails have been stacked along the route to West Vale, to which place an extension is to be made as soon as road widenings have been completed.

**Open Cars for Southend.**—The light railways engineer has been directed to obtain tenders for the supply of three single-deck open cars, which could be covered in during inclement weather, for use in connection with the extensions to Bourne Green and Thorpe Hall Avenue. The Light Railways Committee believe that the cars will gain much extra traffic in the summer time.

**Impending Purchase of Omnibuses for Edinburgh.**—In order to definitely decide upon the routes to be worked, and to further consider the type of motor omnibus to be acquired by the City Council, the Tramways Committee on December 10 took a ride in one of the single-decked petrol omnibuses plying between the city and Uphall. The question will be further discussed at the January meeting, when tenders for six vehicles will be opened.

**Track Maintenance at Ashton.**—The Tramways Committee have agreed to contribute to the Highways Committee £550 per annum to cover cost of maintenance of the tramways, to pay the actual cost for materials and labour necessary in case of renewals, and to provide all rails, points or any other steelwork required. No renewals are to be executed without first being reported to the tramways department.

**A London Car Shed Extension.**—In regard to an estimate of £18,900 already approved for the erection of the extension of Abbey Wood car shed, the Highways Committee have reported to the London County Council that it would be necessary to execute certain paving, track, overhead, and lighting works at an estimated cost of £1,670. A traverser and hydraulic pit jacks must also be provided at an estimated cost of £650 and £210 respectively. The works should be carried out by the staff of the tramway department. The recommendation was agreed to.

**Separate Tracks for Birmingham and Southend Extensions.**—The impending extension of the Birmingham tramways to Northfield is to be constructed on a separate track, and the rails will be laid on sleepers. By adopting this course the chairman of the Tramways Committee estimates a saving of about £3,000 per mile of road for paving, besides effecting economy in maintenance.—To connect the new residential seaside district of Thorpe Bay with Southend the Corporation have constructed a new road 100ft. wide. Half of it is used as a carriage drive, and on the other half an extension of the tramway system is being constructed on sleepers. The tramway will be enclosed on each side by a shrubbery.

**The Future of Road Traction.**—The Mayor of Durban, South Africa, in referring with satisfaction to the deferred decision of the Council in regard to a proposed important tramway extension, said that recent developments in regard to road traction appeared to him to indicate that the days of the tramway were numbered and that motor and electric 'buses would ere long supplant the tramcar equipment.

**Value of Tramway Standards.**—Whilst motorists are urging for the removal of the centre standards in the Glasgow tramway system, others are declaring that there is no evidence whatever of any desire on the part of the ratepayers in Hillhead and Kelvinside for the removal of these splendid elements of safety for the pedestrian. The poles, it is contended, serve a most useful purpose in splitting the traffic, and if the scorching motorist is compelled to slow down to a reasonable speed the public are all the better pleased.

**Light Railways Order.**—The Board of Trade have recently confirmed the under-mentioned Order made by the Light Railway Commissioners:—West Hartlepool Light Railways (Amendment) Order, 1913, authorising the Corporation of West Hartlepool to borrow money for the purpose of purchasing the light railways authorised by the West Hartlepool Light Railways Order, 1897, and by the West Hartlepool Light Railways (Deviation, etc.), Order, 1901, and for other purposes.

**Screens for Motormen.**—For some years the Manchester tramcars which travel beyond the city boundary have been fitted with glass screens. Cars confined to the city are not so fitted up, as in heavy rainstorms the wet glass impedes the drivers' view of the traffic. Birkenhead tramways department are experimenting with a screen made in three sections, the top and bottom pieces being of celluloid and the middle part of glass. When not in use the screen can be packed away in a small box.

**Revised Fares at Salford.**—Following a revision of the tramway fares instituted in November on four routes, at an estimated cost of £5,000 per annum, the Council expressed the opinion that other routes should also be considered. Mr. G. W. Holford, the general manager, has prepared an extended scheme, which will be presented at the next meeting of the Council. If the Council decide to carry out the whole of the proposals it is estimated that the reductions will cost some £11,000. It is hoped, however, that the longer stages will recoup the Corporation by the greater use made of the cars.

**Alleged Overcrowding at Stoke.**—Councillor G. Hassall informed the Stoke-on-Trent Council on December 18 that on the route from Hanley to Goldenhill he had known times when 75 persons had been crowded on tramcars which were only built to accommodate 28. He had also seen 14 on the back platform. The Town Clerk informed the Council that the manager of the company attended a meeting of the Estates Committee, and submitted a census of the traffic on the Goldenhill to Hanley route, between November 9-18, showing particularly the cars which had been overcrowded. The committee informed the manager that they were not in a position to question the figures, but that it was obvious to the Council that there was continual overcrowding, and that in the opinion of the committee this overcrowding could to a certain extent be remedied. The Council decided to give the company notice that unless there was an improvement in a month the Council would institute a prosecution.

**Repair of Solid Tyres.**—In view of the great and continued advance of the commercial motor vehicle the announcement by the Continental Tyre Company, 3 and 4, Thurloe Place, South Kensington, S.W.—makers of the famous "T" pattern solid band tyre—that they can carry out repairs to solid tyres owing to extensions to their repairing plants will be heartily welcomed. The importance of this development, which is the result of investigation and careful experiment, cannot be overrated. Solid tyres frequently suffer serious injury in the course of work, and owners have had to bear the heavy expense of early replacement, whereas now, at a comparatively trifling cost, they can have their injured tyres restored to their normal condition, and made as fit for further use as when they were new. This is, of course, provided the damage to the tyre is not so vital as to render repair hopelessly impracticable. Particulars and estimates for repairs will be gladly supplied by the Continental Tyre Company.

**Inspection of New Plant at Newport.**—Under the guidance of Councillor J. Moxon, chairman of the Electricity and Tramways Committee, and Mr. A. Nichols Moore, borough electrical and permanent way engineer, a large company on December 17 inspected the new turbo-alternator and other plant at the generating station. Councillor Moxon mentioned that until three o'clock that afternoon there had been no opportunity of experimenting. Thus the satisfactory way in which the new machinery had worked was most gratifying. Without any disparagement to the makers, who had done their best to give satisfaction, the chief credit was due to the fact that they had had the best brains and the almost inexhaustible physical energy of the staff devoted to the work. No words could express the gratitude he felt to Mr. Moore and to Mr. Thain. It had not been an 8 hours or even a 16 hours' day, but for the last few days a 24 hours' day, and the work reflected great credit upon them. He was sure they were more than repaid for the trouble they had taken in the knowledge that it was all appreciated. He believed the undertaking would now go on and prosper.

**Tramway Traffic Pressure at Glasgow.**—Considerable advantage in dealing with the pressure of traffic during the holidays will be derived from the temporary abolition of the rule which forbids passengers standing in covered double-deck cars, and by permitting

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six persons to stand at the driver's end of the lower saloon. The gauge at Glasgow is 4ft. 7¾in., and Mr. Dalrymple states that the Act of Parliament prevents the department making the cars any wider than they are now. Some years ago the Tramways Committee endeavoured to get authority to widen the cars a couple of inches, but there were protests against cars taking up more room on the streets. The Corporation have instructed the department to proceed with the erection of 150 additional cars, which will bring the total up to 1,000 cars. In the old days Glasgow prided itself on carrying on an average 11 passengers per mile; the third week in December showed an average of 15. No city in the Kingdom, it is said, equal those figures. On the longest route —Paisley to Uddington and Baillieston—695,000 persons were carried in the above week, 407,000 being halfpenny fares. Over the whole system fully 64 per cent. were halfpenny fares. Passengers travelling the penny distance were almost 27 per cent., which left only 9 per cent. of the whole over a penny. The average for each passenger is about ¾d.

**Damages Against London Tramway Authorities.**—In the King's Bench Division a music hall performer named Burdett was awarded £125 damages against the London County Council for personal injuries said to have been received through his foot catching against a stud in the platform of a car at Shoreditch. It was alleged that the stud, which worked the sanding apparatus, projected two inches above the level of the boards. For the defence it was stated that plaintiff might have slipped from the platform, but that was not due to negligence on the part of the driver.—At Bow County Court a boiler maker named John McDowell obtained judgment for £100 for injuries sustained through being knocked down by a Leyton Council tramcar while he was in a crowd boarding a car belonging to West Ham Council at Albert Docks. Evidence was given that it was impossible for inspectors or policemen to control the crowds and get them to board the cars in an orderly manner. It was urged for the defendants that they were not responsible because the lines belonged to the West Ham Corporation, and the defendants only had running powers over them.—Damages amounting to £128 and costs were recently awarded at Westminster County Court to two Battersea horse-dealers, named Patrick Flynn and Edward Harne, against the London County Council for injuries sustained and the value of a horse, following an accident in High Street, Woolwich, due to the defective condition of the tramlines. The evidence showed that at the point where the accident occurred the lines were an inch and a half above the level of the surrounding roadway.

## PERSONAL.

**Alderman Finnigan,** at the request of the chairman and members of Belfast Tramways Committee, has withdrawn his resignation of the vice-chairmanship.

**Mr. C. Macarthy,** a conductor employed by the Swansea Tramways Company, is said to have received a communication from a firm of South African solicitors to the effect that he is entitled to a considerable sum of money.

**Mr. R. W. Bruce,** of London, has been appointed general superintendent and chief engineer of the Canada Electric Co., Amherst, N.S. He will also have charge of the electrical equipment of the Maritime Coal, Railway and Power Company at Joggins Mines.

**Mr. H. G. Sabine,** formerly chief ticket inspector to the Isle of Thanet Tramways Company, who now holds an appointment in the Government Tramways of Western Australia, has sent his old colleagues at Ramsgate Christmas greetings in verse. In his new sphere he is known as the "tramway poet."

**Mrs. Schofield,** wife of Mr. F. Schofield, tramways manager at Leyton, presented the prizes awarded at a fancy dress ball arranged by the Leyton Tramways Social and Athletic Club. This was the first event of the kind arranged by the club, and the judging was entrusted to the chairman of the Council, Councillor Heather, chairman of the Tramways Committee, and the manager, and other gentlemen.

**The Rev. F. A. W. Wilkinson,** on leaving West Ham to become Vicar of Chertsey, Surrey, has been presented by the members of the West Ham branch of the Tramwaymen's Brotherhood with gifts for himself and Mrs. Wilkinson. The attendance included the Rev. Dr. Darlington, founder of the Brotherhood, and Mr. J. S. D. Moffet, general manager, West Ham Corporation tramways.

**Mr. Peter Fisher,** general manager, Dundee Corporation tramways, and Mr. Robertson, Greenock borough electrical engineer, are advising Stirling Corporation on the questions whether that body shall construct electric tramways or dispose of their electricity undertaking for £32,000 to Messrs. Balfour, Beattie, and Co., who have offered to install electric tramways, and to give reductions in charges for private and public lighting. The electrical engineer and the borough surveyor have prepared a report in which they estimated the cost of constructing tramways at £78,000.

**Mr. S. E. Smith,** one of the directors of the Bristol Tramways and Carriage Company, presided on December 20 at the first annual staff dinner of the motor constructional works of the company, which have now been open for a year. In responding to the toast of the motor constructional works, the chairman said they had a very well-filled staff, the only link missing being that of works manager, but they hoped to fill that vacancy very soon. They had works that were as well equipped as any in the country. Labour and capital each had their responsibilities; they were not antagonistic, as they were constantly hearing nowadays. They must both try to carry out their responsibilities; the directors were doing their part, and he was sure the employees were also doing their best. They were not to think that anyone would be victimised for complaining, and every complaint would be carefully considered. That was a necessary feeling to exist if they were to ensure success.

**Expert Aid Suggested for Directors.**—Mr. Fleming, a shareholder, speaking at the Burmah Tramways Company meeting, said he did not suggest that the company was not well managed, but he suggested that the directors should allow the stockholders to have on the board a modern tramway operating man. In reply, the chairman observed that the fees of the directors amounted to the large sum of £100, and an expert was not going to devote his time to the company for £100 per annum. But the suggestion should be considered, and if they saw any prospect of getting such assistance they would be only too delighted.

**Mr. H. W. Laing,** general manager and electrical engineer to Blackpool, St. Anne's, and Lytham Tramways Company, was referred to at the annual meeting by the chairman, Mr. Geo. Nicholson, who stated that the traffic expenses, costs and the cost of current per car mile continued to be the lowest in the country. They owed this result to the constant care and vigilance of their manager, Mr. Laing, who was deserving of their thanks. Referring to a complaint made by Mr. Boyd, a shareholder, as to the charge for current by Blackpool Corporation, the chairman said such remarks would prejudice the directors in their negotiations with the Council.

**Alderman D. L. Winter,** chairman of the Rotherham Tramways Committee, has published a letter in the local papers explaining the reasons why he intends asking the Board of Trade to hold an inquiry into the decision to double the Fitzwilliam Road tramways and to construct a line through Nottingham Street. He has had statements prepared which show that with the five minutes' service now run in Fitzwilliam Street the delays to would-be passengers are a negligible quantity. Alderman Winter refers to Nottingham Street as being too narrow for tramways, and condemns the project as being unnecessary. The tramways manager and the borough engineer are opposed to the schemes.

**The Late Mr. T. Blane.**—Reference was made by Mr. G. Nicholson, the chairman, at the annual meeting of the Blackpool, St. Anne's, and Lytham Tramways Company, to the death of Mr. Thos. Blane, formerly chairman of the company, which occurred shortly after the last annual meeting. The board, Mr. Nicholson said, had lost a valued colleague, whose wide experience and sound judgment were always readily placed at the call of his colleagues. To fill the vacancy Mr. Thos. Preston, of St. Anne's, had been elected a director.

## FINANCIAL REPORTS AND MEETINGS.

**Melbourne Tramway and Omnibus Company.**—A quarterly dividend of 6d. per share and a bonus of 6d. per share are announced, payable on January 2.

**Winnipeg Electric Railway Company.**—A dividend at the rate of 3 per cent. for the quarter ending December 31 has been declared on the fully paid-up capital stock.

**Yorkshire (West Riding) Electric Tramways Company.**—The directors announce a dividend at the rate of 5 per cent. per annum on the 6 per cent. preference shares, making 4 per cent. for the current year.

**Proposed Purchase of Brisbane Tramways.**—The Premier of Queensland has given notice in the Assembly of the introduction of a Bill dealing with the acquisition of the Brisbane tramways by the local authorities at the expiration of the company's time. He said the Bill need not go beyond the first reading this session.

**Traction and Power Securities, Limited.**—At the Law Courts, on December 9, Mr. Justice Joyce heard a petition by the Traction and Power Securities, Limited, for sanction to a reduction in capital. Mr. Hughes, K.C., for the company, said they had more money than they wanted. This surplus amounted to £174.000, and what was proposed was to apply that in paying £2 a share back to the shareholders. His Lordship sanctioned the reduction.

**Manx Electric Railway.**—The gross receipts for the year to September 30 amount to £40.160, and the gross expenditure to £18.740. Including £920 brought forward, there remains a total of £22,340. After deducting debenture interest amounting to £9.000, and the amount of the interim dividend of 2¾ per cent. on the preference shares, there remains £9,759. It is proposed to allocate to reserve for special renewals £2.000, and to pay a dividend of 2 per cent. on the ordinary shares, leaving £2,179 to be carried forward.

**Isle of Thanet Tramways Company.**—Mr. A. R. Monks, presiding at the annual meeting of the Isle of Thanet Electric Tramways and Lighting Company, in London, on December 8, said that the profit for the past year was £21,635, against £10.769 in the previous year. They were paying 3 per cent. on the preference shares, placing £2,000 to rolling stock reserves, and £6,000 to future maintenance of permanent way. In order to meet motor char-a-banc competition, they had hired two single-deck motor-omnibuses and secured a profit of over £300.

**Douglas Southern Electric Tramways.**—The report states that the traffic receipts for the season were £6.492, against £5.204. The passengers carried were 265,763, against 212,528. The net profit is £2.435, against £1,733. The directors recommend the full dividend on the 7 per cent. non-cumulative preference and a dividend of 3¼ per cent. on the ordinary shares, absorbing £2,321, carrying

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forward £291. Mr. T. J. Hutchinson, who presided at the annual meeting, said the year had been a profitable one. The dividend on the ordinary shares was also higher than had ever been paid previously.

**Buenos Aires Port Tramways Company.**—Mr. George Kitchin, presiding at the annual general meeting of the Buenos Aires Port and City Tramways on December 15, stated that so far the returns for the current year, though showing an improvement on the latter part of 1912, could not be said to be satisfactory. It would not appear that the expenses had been reduced below an average of about 90 per cent. for the first eight months of the year. Two of their directors, Dr. M. Lacroze and Mr. John B. White, were leaving for Buenos Aires on January 9 to examine the condition of the property and the best means of working it and to consult with the local committee. When they met to consider the accounts for 1913—which, he hoped, they might do in June of next year—he anticipated being able to put a more satisfactory statement before them. That in the course of the year £17,507 should have been spent on cars and car-bodies seemed almost incredible. This expense had been incurred notwithstanding that for the two preceding years, when called upon to face an additional expenditure in respect of cars and car-bodies, they had been each time informed that such expenditure was exceptional, and already practically finished. Notwithstanding that, Messrs. J. and G. White, in the report they had prepared for the board, stated that they "figure out that a complete revision of the cars and fitting up in a normal state would cost about £4,000." A cable message received that morning showed an increase of traffic up to the end of November of £7,340. The working expenses for the last three months averaged 84.50 per cent.

**Burma Electric Tramways and Lighting Company.**—Mr. D. C. Ellis presided at the annual meeting of the Burma Electric Tramways and Lighting Company. He said that the past year's results were the best attained since the formation of the company, the earnings amounting to £7,575, against £3,748 in the previous year. This improved result was attributable to the increase in receipts from both traffic and light and power supply, and the saving in power and generating expenses due to the use of the Diesel engine in the place of the steam set. There had been placed to reserve for depreciation the sum of £5,000, against which account would be debited the cost of the second Diesel set, which was now on order. The balance of £2,575 added to the sum of £1,333 brought forward gives an available amount of £3,908, out of which it was proposed to pay a dividend of 3 per cent. on the preference shares, leaving £908 to be carried forward. In view of the opposition to the scheme of the board for dealing with the eight years' preference divided arrears, they had decided to postpone the matter in order that the earning capacity of the system might be more definitely ascertained. The manager and chief engineer, Mr. A. H. Burbidge, in commenting on the year's working, had pointed out that the improved result was to a great extent due to what he considered exceptional conditions, and warned the board not to anticipate a corresponding increase in the future. This warning was obviously given to prevent an exaggerated and unsafe estimate of the earning capacity of the undertaking being made. The report was adopted.

**Blackpool Tramways Company's Chars-a-Banc Services.**—It was stated by Mr. G. Nicholson, who presided at the annual meeting of the Blackpool, St. Anne's and Lytham Tramways Company on December 15, that the directors intend to extend the motor chars-a-banc service as far as they possibly could, and additional powers would have to be obtained. The motor chars-a-banc they had purchased cost £850, and the results of long-distance trips to Southport, the Lakes, etc., were very satisfactory. The St. Anne's Council from the end of May reduced the cost of current to 1½d. per unit, a reduction of a farthing, and they had also granted concessions on the rent of the feeder cable and on the charge for arc lamps. The reduction altogether would amount to over £400 per annum. Owing to the fine weather the traffic receipts were £2,800 more than in the next best year. The cheap evening return tickets from Lytham and St. Anne's had been made good use of, and would be more popular still if the cars had covered tops, but owing to the company's financial condition they could not undertake this expenditure. The traffic expenses, costs, and the cost of current per car mile continued to be the lowest in the country. They had spent £4,800 on repairs to the track, as against £3,272 in 1912. The expenditure in this direction next year would again be above normal, but they hoped that after the next two years this extraordinary expenditure would cease. Mr. Boyd strongly complained of the conditions imposed by Blackpool Corporation, and another shareholder asked if it would not be well to wind up the concern altogether, to which the chairman replied that if they did they would get nothing at all. The meeting adopted the directors' report, in which it was stated that the trustees for the debenture holders had, upon the recommendation of the directors, intimated their intention of paying 2½ per cent. interest on account of arrears of interest due on the debenture stock. The net balance of revenue for the year was £5,056, and after the payment of £7,500 for debenture interest and £1,500 to the sinking fund, the balance carried down shows a debit of £34,103.

## NEW AND PROSPECTIVE WORK.

BOURNEMOUTH.—The Beach Committee have been directed to consider the question of a miniature tramway for the Undercliff Drive between Bournemouth and Boscombe Piers. Some time ago the Council disapproved of a scheme to extend the tramways, and permission to use the Drive has also been refused to the owners of motor char-a-bancs. A proposal placed before the Beach Committee provides for the use of railless electric cars weighing about 2½ tons and holding about 15 persons.

BURY.—The Tramways Committee have asked the Board of Trade to consent to the laying of a track in connection with the Limefield extension of tramways at the same time as the granite paving would be laid down.

HUDDERSFIELD.—A report is to be prepared on the advisability of doubling the track on the Outlane, Longwood, and Sheepbridge sections.

SOUTH SHIELDS.—The Tramways and Parks Committees are considering a scheme submitted by Mr. W. T. Robson, the tramways manager, for a light railway extension of the tramways along Sea Road, at an estimated cost of £4,940, in order to open up the beach at holiday time by the erection of a floral pavilion for an orchestra and other forms of entertainment.

## COPPER AND ALUMINIUM MARKET.

December 23, 1913.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

| | Tuesday, December 23. | Last Friday. | A Year Ago. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| Standard Copper (cash) .. .. .. | 64 5 0 .. | 64 5 0 .. | 75 2 6 |
| ,, ,, (three months) .. .. | 64 15 0 .. | 64 5 0 .. | 77 5 0 |
| Electrolytic Copper—bars or ingots .. | 66 15 0 .. | 65 15 0 .. | 82 0 0 |
| Aluminium—bars or ingots .. .. .. | 83 0 0 .. | 83 0 0 .. | 86 10 0 |

## COAL MARKET.

December 23, 1913.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

| | Tuesday, December 23. | Last Friday. | A Year Ago. | Two Years Ago. |
|---|---|---|---|---|
| London, free into barge in Thames— | s. d. | s. d. | s. d. | s. d. |
| Best Admiralty Welsh (large) | 26 0 .. | 26 0 .. | 23 6 .. | 22 3 |
| Best Seconds .. .. .. | 25 0 .. | 25 0 .. | 23 3 .. | 21 6 |
| Ordinary Drys .. .. | 23 0 .. | 23 0 .. | 22 0 .. | 20 6 |
| Best Washed Nuts .. .. | 21 0 .. | 21 0 .. | 21 0 .. | 19 6 |
| Best Washed Peas .. .. | 19 6 .. | 19 6 .. | 19 9 .. | 18 0 |
| Cardiff, f.o.b.— | | | | |
| Best Admiralty (large) .. | 21 6 .. | 21 6 .. | 18 6 .. | 17 3 |
| Best Seconds .. .. | 20 6 .. | 20 6 .. | 18 3 .. | 16 6 |
| Ordinary Drys .. .. | 18 6 .. | 18 6 .. | 17 0 .. | 15 6 |
| Best Washed Nuts .. .. | 16 6 .. | 16 6 .. | 16 6 .. | 14 6 |
| Best Washed Peas .. .. | 15 0 .. | 15 0 .. | 14 9 .. | 13 0 |
| Newcastle, f.o.b.— | | | | |
| Best Steams .. .. .. | 15 3 .. | 15 6 .. | 15 3 .. | 11 9 |
| Best Seconds .. .. .. | 13 0 .. | 13 3 .. | 14 0 .. | 11 0 |
| Smalls .. .. .. | 7 0 .. | 7 0 .. | 11 6 .. | 6 6 |

## FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

| NAME. | Week or Month. | Latest Return. 1912. | Latest Return. 1913. | Aggregate. Wks. | Aggregate. 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|
| Anglo-Argentine ..... | Dec. 16 | £56,863 | £61,918 | 50 | £2,789,623 | +£203,406 |
| Auckland..... (28 days) | Nov. 21 | 19,174 | 10,497 | 21 | 92,254 | — 4,949 |
| Ballarat and Bendigo | October | 444 6 | 4,356 | 3 | 26,988 | — 605 |
| Brazilian St. Rly. Mlrs. | Nov. | 44,278 | 58,642 | 17 | 207,214 | + 85,873 |
| Brazilian Traction..... | Dec. 6 | 84,177 | 98,237 | 49 | 4,419,737 | ... |
| Brisbane ..... | Nov. | 24,310 | 27,053 | 48 | 287,071 | + 55,650 |
| British Columbia .....$ | October | 721,621 | 753,501 | 17 | 3,014,355 | + 279,148 |
| Buenos Aires Pt. & City | October | 6,615 | 7,142 | 43 | 68,109 | + 5,294 |
| Buenos Aires Lacroze.. | Nov. | 44,671 | 45,746 | 22 | 225,270 | + 8,901 |
| Calcutta.....Rs. | Dec. 20 | 62,610 | 67,406 | 51 | 33,00,634 | + 1,56,005 |
| Cape Town ..... | Nov. | ... | 12,555 | ... | ... | .. |
| Carthagena & Herrerias | Nov. | 1,703 | 1,922 | 47 | 28,165 | + 4,620 |
| Cordoba..... | October | 12,524 | 13,285 | 30 | 94,023 | + 9,230 |
| East India ..... | Nov. | 1,924 | 1,922 | 17 | 7,883 | + 145 |
| Kalgoorlie..... | Nov. | 2,861 | 2,504 | 48 | 31,603 | — 8,001 |
| La Plata..... | Nov. | 5,210 | 5,409 | 44 | 55,840 | + 9,526 |
| Lima..... | Sept. | 22,660 | 34,110 | 39 | 800,647 | + 23,783 |
| Lisbon ..... Mlrs. | Sept. | ... | 144,538 | ... | ... | ... |
| Madras (14 days) Rs. | Dec. 15 | 23,821 | 27,079 | 50 | 613,392 | + 44,791 |
| Melbourne ..... | Nov. | ... | 63,500 | ... | ... | ... |
| Mexico .....$ | Nov. | 563,239 | 605,467 | 48 | 6,387,905 | + 177,861 |
| Montevideo..... | Nov. | 29,628 | 30,530 | 4 | 80,530 | + 907 |
| Para ..... | Dec. 14 | 3,910 | 3,284 | 2 | 6,785 | — 1,286 |
| Port Elizabeth..... | Nov. | ... | 3,590 | ... | ... | ... |
| Shanghai .....$ | Dec. 17 | 18,598 | 22,000 | 50 | 1,133,416 | + 133,054 |
| Singapore .....$ | Dec. 20 | 10,380 | 11,451 | 51 | 609,357 | + 78,575 |
| Toronto .....$ | October | 754,104 | 861,235 | 43 | 8,044,705 | +1,069,557 |
| Winnipeg.....$ | October | 321,039 | 357,313 | 43 | 3,388,748 | + 280,156 |

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## TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Aberdeen Corporation.. | Dec. 17 | £1,315 | £1,459 | + £144 | 29 | £47,552 | + £3,110 |
| Accrington Corp. | ,, 17 | 548 | 572 | + 24 | 37 | 21,521 | + 2,005 |
| Ayr Corporation | ,, 13 | 200 | 236 | + 36 | 30 | 12,712 | + 1,835 |
| Bath Electric | ,, 17 | 697 | 730 | + 33 | 51 | 48,434 | + 3,883 |
| Birkenhead Corp. | ,, 14 | 1,174 | 1,259 | + 85 | 37 | 48,016 | + 4,679 |
| Birmingham Corp. | ,, 13 | 11,591 | 12,519 | + 928 | 37 | 436,265 | + 38,485 |
| Blackburn Corporation | ,, 18 | 1,100 | 1,169 | + 69 | 38 | 50,276 | + 4,695 |
| Blackpool Corporation | ,, 18 | 440 | 459 | + 19 | 37 | 75,598 | + 12,093 |
| Bolton Corporation | ,, 14 | 2,540 | 2,711 | + 171 | 37 | 101,669 | + 6,050 |
| Bournemouth Corp. | ,, 17 | 1,550 | 1,626 | + 76 | 37 | 80,536 | + 9,483 |
| Bradford Corporation... | ,, 18 | 5,486 | 5,994 | + 508 | 36 | 220,300 | + 14,140 |
| Brighton Corporation... | ,, 21 | 856 | 830 | − 26 | 38 | 43,075 | + 2,964 |
| Bristol | ,, 19 | 7,405 | 7,396 | − 9 | 50 | 403,893 | + 52,517 |
| British Elec. Federatn. | ,, 12 | 38,551 | 44,325 | * | ... | ... | ... |
| Burnley Corporation | ,, 20 | 1,547 | 1,546 | − 1 | 33 | 61,905 | + 7,380 |
| Burton-on-Trent Corp. | ,, 14 | 270 | 292 | + 22 | 37 | 10,820 | + 561 |
| Bury Corporation | ,, 21 | 1,248 | 1,250 | + 7 | 38 | 51,638 | + 2,143 |
| Cardiff Corporation | ,, 13 | 2,519 | 2,632 | + 113 | 37 | 101,719 | + 10,943 |
| Chatham and District.. | ,, 11 | 818 | 850 | + 32 | 49 | 45,641 | + 2,959 |
| Chesterfield Corp. | ,, 18 | 238 | 251 | + 13 | 37 | 9,757 | + 1,166 |
| Colne & Trawden | ,, 13 | 252 | 237 | − 15 | 50 | 13,638 | + 816 |
| Cork Electric | ,, 11 | 449 | 474 | + 25 | 49 | 24,680 | + 740 |
| Croydon Corporation | ,, 5 | 1,619 | 1,566 | − 53 | 35 | 59,397 | − 5,757 |
| Darlington Corporation | ,, 13 | 221 | 231 | + 10 | 37 | 9 239 | + 891 |
| Derby Corporation | ,, 13 | 878 | 898 | + 20 | 37 | 36,566 | + 3,096 |
| Dover Corporation | ,, 13 | 189 | 182 | − 7 | 37 | 9,456 | + 190 |
| Dublin & Lucan | ,, 19 | 116 | 121 | + 5 | 24½ | 3,592 | Nil |
| Dublin United | ,, 19 | 5,812 | 5,298 | − 514 | 50 | 275,672 | − 16,713 |
| Dundee City | ,, 17 | 1,186 | 1,266 | + 80 | 31 | 40,850 | + 3,162 |
| East Ham Corporation | ,, 20 | 1,075 | 1,054 | − 21 | 38 | 39,042 | − 1,582 |
| Exeter Corporation | ,, 19 | 295 | 302 | + 7 | 38 | 13,236 | + 884 |
| Gearless Motor 'Buses. | ,, 13 | ... | 492 | ... | 36 | 17,944 | ... |
| Glasgow Corporation | ,, 13 | 19 317 | 20,643 | + 1,326 | 29 | 569,308 | + 43,488 |
| Glossop(U.Elec.Supply) | ,, 13 | 127 | 118 | − 9 | 50 | 6,453 | + 586 |
| Halifax Corporation | ,, 16 | 1,816 | 1,865 | + 49 | 37 | 79,465 | + 2,894 |
| Hastings & District. | ,, 18 | 712 | 742 | + 31 | 51 | 52,356 | + 3,845 |
| Huddersfield Corp. | ,, 13 | 2,015 | 1,990 | − 25 | 37 | 79,023 | + 4,724 |
| Hull Corporation | ,, 20 | 3,208 | 3,234 | + 26 | 38 | 119,544 | + 6,311 |
| Ilford U.D.C. | ,, 13 | 417 | 419 | + 2 | 37 | 16,778 | − 883 |
| Ilkeston Corporation | ,, 17 | 113 | 122 | + 9 | 38 | 5,067 | + 781 |
| Ipswich Corporation | ,, 13 | 371 | 368 | − 3 | 37 | 17,415 | + 754 |
| Isle of Thanet | ,, 20 | 292 | 293 | + 1 | 12 | 4,402 | + 484 |
| Kilmarnock Corp. | ,, 20 | 155 | 158 | + 3 | 31 | 5,528 | + 280 |
| Lanarkshire | ,, 11 | 1 531 | 1,731 | + 200 | 49 | 84,689 | + 11,067 |
| Lancashire United | ,, 17 | 1,321 | 1,529 | + 208 | 50 | 78,282 | + 9,841 |
| Leeds City | ,, 6 | 7,499 | 8,070 | + 571 | 36 | 298,887 | + 19,202 |
| Leicester Corporation... | ,, 13 | 2,675 | 2,729 | + 54 | 50 | 140,020 | + 12,592 |
| Leith Corporation | ,, 13 | 619 | 633 | + 19 | 30 | 21,798 | + 1,087 |
| Leyton U.D.C. | ,, 11 | 1,231 | 1,254 | + 23 | 36½ | 49,392 | + 403 |
| Liverpool Corporation.. | ,, 13 | 12,619 | 13,091 | + 472 | 50 | 642,779 | + 47,970 |
| Llandudno & Colwyn B. | ,, 12 | 133 | 144 | + 11 | 2 | 251 | + 17 |
| London County Council | ,, 10 | 41,904 | 42,752 | + 848 | 36 | 1,533,358 | + 4,985 |
| London Gnl. Omnibus. | ,, 20 | 60,393 | 61,528 | + 1,135 | 51 | 3,150,312 | + 513,512 |
| London United | ,, 12 | 5,511 | 5,536 | + 25 | 50 | 312,789 | + 6,715 |
| Lowestoft Corporation | ,, 20 | 176 | 199 | + 23 | 11 | 2,237 | + 178 |
| Maidstone Corporation | ,, 11 | 158 | 170 | + 12 | 37 | 7,700 | + 575 |
| Manchester Corp. | ,, 13 | 17,084 | 17,617 | + 533 | 37 | 652,559 | + 33,339 |
| Met. Elec. Trys. | ,, 12 | 8,629 | 8,573 | − 56 | 50 | 459,464 | + 15,495 |
| Nelson Corporation | ,, 13 | 193 | 176 | − 17 | 37 | 7,810 | + 438 |
| N'castle-on-Tyne Corp. | ,, 13 | 5,081 | 4,971 | + 110 | 37 | 180,895 | + 16,531 |
| Newport (Mon.) Corp. | ,, 6 | 678 | 760 | + 82 | 36 | 27,821 | + 2 336 |
| New St. Helens & Dist. | ,, 17 | 704 | 736 | + 32 | 25 | 20,464 | + 2,121 |
| Northampton Corp | ,, 20 | 503 | 531 | + 28 | 38 | 21,985 | + 1,491 |
| Nottingham Corp. | ,, 18 | 3,132 | 3,187 | + 55 | 37½ | 126,470 | + 5,484 |
| Oldham Corporation | ,, 14 | 1,979 | 2,163 | + 184 | 38 | 84,203 | + 6,141 |
| Portsmouth Corp. | ,, 13 | 1,755 | 1,957 | + 202 | 37 | 86,606 | + 6,234 |
| Preston Corporation | ,, 17 | 799 | 792 | − 7 | 33 | 33,652 | + 2,166 |
| Provincial | ,, 13 | 1,602 | 1,703 | + 101 | 10 | 18,364 | + 1,343 |
| Reading Corporation | ,, 18 | 648 | 660 | + 12 | 37 | 26,326 | + 2,063 |
| Rochdale Corporation | ,, 13 | 1,451 | 1,472 | + 21 | 37 | 59,784 | + 2 652 |
| Rotherham Corp. | ,, 17 | 870 | 1,004 | + 134 | 37 | 37,568 | + 8,446 |
| Salford Corporation | ,, 15 | 5,022 | 5,262 | + 240 | 37 | 194 902 | + 8 406 |
| Sheffield Corporation | ,, 14 | 7,226 | 7,526 | + 299 | 38 | 277,427 | + 22,593 |
| Southampton Corp. | ,, 10 | 1,118 | 1,199 | + 81 | 36 | 49,081 | + 3,333 |
| Southend-on-Sea Corp. | ,, 17 | 580 | 662 | + 102 | 38 | 37,238 | + 6,522 |
| South Met. Trys. | ,, 12 | 752 | 1,050 | + 298 | 50 | 47,400 | + 5,681 |
| South Shields Corp. | ,, 13 | 641 | 653 | + 12 | 37 | 26,747 | + 3,277 |
| Sunderland Corp. | ,, 21 | 1,363 | 1,399 | + 36 | 38 | 55,191 | + 5,402 |
| Sunderland District | ,, 10 | 525 | 527 | + 2 | 6 | 3 346 | + 414 |
| Swindon Corporation | ,, 17 | 154 | 151 | − 3 | 37 | 6,268 | + 406 |
| Trys. (M.E.T.) 'Buses | ,, 13 | ... | 8,755 | ... | 48 | 257.212 | ... |
| TynesideTrys.&Tmrds | ,, 17 | 400 | 476 | + 76 | 25 | 12.914 | + 523 |
| Wallasey Corporation | ,, 20 | 1 077 | 1,123 | + 46 | 38 | 46,830 | + 4,356 |
| Walsall Corporation | ,, 13 | 611 | 631 | + 20 | 50 | 31,173 | + 2,240 |
| Walthamstow U.D.C. | ,, 20 | 676 | 724 | + 48 | 38 | 28,496 | + 1,051 |
| Warrington Corp | Nov. 27 | 438 | 458 | + 20 | 35 | 15,018 | + 502 |
| West Ham Corporation | Dec. 11 | 2,558 | 2,648 | + 90 | 36 | 99,792 | + 3.990 |
| Wigan Corporation | ,, 18 | 1,438 | 1,489 | + 51 | 37½ | 56,074 | + 5,523 |
| Wolverhampton Corp | ,, 17 | 1,032 | 1,068 | + 36 | 38 | 40.796 | + 2.257 |
| Yorkshire (W. Riding | ,, 14 | 1,257 | 1,293 | + 36 | 50 | 72,247 | + 7,428 |

* From such of the services as were working both last year and this year the receipts show a decrease of £4,554 upon the week.

## ELECTRIC RAILWAY TRAFFIC RETURNS.

| NAME. | Week ended | Latest Return. 1912. | 1913. | Incr. or Dec. | Aggregate. Wks. | 1913. | Increase or Dec. |
|---|---|---|---|---|---|---|---|
| Central London | Dec. 20 | £5,969 | £5,539 | − £430 | 51 | £219,714 | + £4,248 |
| City and South London | ,, 20 | 3,223 | 2,870 | − 353 | 51 | 142.054 | − 13,596 |
| Liverpool Overhead | ,, 14 | 1,595 | 1,742 | + 147 | 50 | 85,686 | + 6,480 |
| London Electric | ,, 20 | 14,975 | 14.725 | − 250 | 51 | 697,815 | + 650 |
| Mersey | ,, 20 | 2.413 | 2.320 | − 93 | 51 | 113,758 | + 4,469 |
| Metropolitan | ,, 21 | 17,364 | 18.673 | + 1,309 | 51 | 883,674 | + 33,867 |
| Metropolitan District | ,, 20 | 13,167 | 13.282 | + 115 | 51 | 633 042 | + 18.385 |

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## TRAMWAY AND OMNIBUS SHARE LIST.

| Paid. | | On Week | Quotations, December 23. |
|---|---|---|---|
| ... | Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds. | ... | 72 — 75 |
| 5 | Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref. | ... | 4⅛ — 4⅜ |
| 5 | Do. 5½% Cum. 2nd Pref. | ... | 4 3/16 — 4 7/16 |
| 100 | Do. 4% Deb. Stk. Red. | ... | 90 — 93 |
| 100 | Do. 4½% Deb. Stk. Red. | ... | 97½ — 99¼ |
| 100 | Do. 5% Deb. Stk. Red. | + ½ | 97½ — 99½ |
| 100 | Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red | ... | 101½ — 103½ |
| 1 | Bath Electric Tramways, Lim. Pref. Ord | ... | 7/16 — 9/16 |
| 1 | Do. 5% Cum. Pref | ... | 11/16 — 13/16 |
| 100 | Do. 4½% 1st. Mort. Deb. Stock, Red. | ... | 70 — 75 |
| 100 | Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk. | ... | 86 — 88 |
| 10 | Blackpool and Fleetwood Tramroad Co. | ... | 13½ — 14 |
| | Bombay Elec. Supply and Trams. Co., Ord. | ... | 12 — 13 |
| 10 | Do. do. 6% Cum. Pref. | ... | 10¾ — 11¼ |
| 100 | Do. do. 4½% Db. Stk Red. | + ½ | 94 — 96 |
| $100 | Brazilian Traction Light and Power Co. Lim. | ... | 85 — 87 |
| 5 | Brisbane Elec. Trams. Investment Co., Ltd., Ord. | ... | 7¼ — 7¾ |
| 5 | Do. do. 5% Cum. Pref | ... | 4⅞ — 5⅛ |
| 100 | Do. do. 4½% 1st Deb Stock, Red. | ... | 98 —101 |
| 10 | Bristol Tramways and Carriage Co. | ... | 5¼ — 5¾ |
| 10 | Do. do. 4% Cum. Pref. | ... | 6¼ — 6¾ |
| 100 | Do. do. 4% Deb. Stock | ... | 100 —102 |
| 100 | Do. do. 4½% Deb. Stock | ... | 95 — 97 |
| 100 | British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck. | — 1 | 109 —113 |
| 100 | Do. Pref. Ord. Stock | ... | 102 —106 |
| 100 | Do. 5% Cum. Perpetual Pref. Stock | ... | 102 —105 |
| 100 | Do. 4½% 1st Mort. Debs. | ... | 98 —101 |
| 100 | Do. 4½% Vancouver Power Debs. | ... | 100 —104 |
| 40 | Do. 4½% Perpetual Cons. Deb. Stk. | ... | 92 — 95 |
| 100 | British Elec. Traction Co., Lim., 6% Cum. Pref. | ... | 84 — 87 xd |
| 100 | Do. 7% Non-Cum. Pref. | ... | 52 — 55 |
| 10 | Do. 6% Pref. Ord. Non-Cum. | ... | 10¼ — 12½ |
| 100 | Do. Deferred Ord. Stock | ... | 4 — 5⅛ |
| 100 | Do. 5% Perpetual Debenture Stock | ... | 92 — 93 |
| 100 | Do. 4½% Second Debenture Stock, Red | ... | 77 — 80 |
| 100 | B. Aires Port & City Trms. 6% 1st Deb. Stk. Red. | ... | 84 — 89 |
| 100 | Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb. | ... | 99 —101 |
| 5 | Calcutta Tramways Co., Limited, Ord. | ... | 5⅞ — 6¼ |
| 5 | Do do. 5% Cum. Pref. | ... | 4 1/16 — 5 1/16 |
| 100 | Do. do. 4½% 1st Deb. Stock, Red. | ... | 95 — 98 |
| 1 | Cape Electric Tramways, Ld., | ... | 3/16 — 5/16 |
| 10 | Carthagena and Herrerias Steam Tramways Co., Lim. | ... | 3 — 3¼ |
| 100 | Do. 5% Debs., Red. | ... | 90 — 93 |
| 5 | City of Buenos Ayres Trams. Co. (1904), Lim. | ... | 5¼ — 5½ |
| 100 | Do. 4% Debenture Stock Red, 1965 | ... | 92 — 97 |
| 100 | Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. | ... | 83 — 93 |
| 100 | Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt. | ... | 95½ — 97½ |
| 10 | Cork Electric Tramways and Lighting Co. 5% Cum. Pref. | ... | — 8⅛ |
| 10 | Dublin United Trams. Co. (1896) Lim. Ord. | ... | — 10½ |
| 10 | Do. do. 6% Pref. | ... | — 13 |
| 100 | Do. do. "A" Red. | ... | — 78½ |
| 100 | Do. do. Deb. Stock "B" Red. | ... | — 77 |
| 10 | Gateshead & Dist. Trys. Co., Ord. | ... | 9 — 9¼ |
| 10/ | Hastings & Dist. Electric Trams. Co., Ld., Ord. | ... | 1/16 — 3/16 |
| 1 | Do. do. 6% Cum. Pref. | ... | 5/16 — 7/16 |
| 100 | Do. do 4½% Deb. Stk. Red. | ... | 66 — 71 |
| $1,000 | Havana Electric Railway, Con. Mort. 5% Bonds | ... | 94½ — 98½ |
| 100 | Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.) | ... | 84½ — 89½ |
| 10 | Imperial Tramways, Ord. | ... | 3½ — 4¼ |
| 10 | Do. do. 6% Cum. Pref. | ... | 6¼ — 6¾ |
| 100 | Do. do. 4½% Deb. Stock | ... | 76½ — 77½ |
| 5 | Isle of Thanet Elec. Trams. & Ltg. Co., 6% Cum. Pref. | ... | 2 — 2¼ xd |
| 100 | Do. 4% Debenture Stock | ... | 73 — 78 |
| 1 | Kalgoorlie Elec. Trams., Ltd. | ... | 0 — 1/16 |
| 100 | Do. do. 5% "A" Deb. Stk. | ... | 85 — 90 xd |
| 100 | Do. do. 6% "B" do. | ... | 10 — 20 |
| 7/6 | La Plata Elec. Trys. Co., Lim., 6% Cum. Pref. | ... | 3/16 — 1 |
| 10 | Lanarkshire Tramways Co. | ... | 9¼ — 10¼ |
| 100 | Lancashire United Tramways. 5% Prior Lien Deb. | ... | 77 — 81 |
| 1 | Lisbon Electric Trams., Lim., Ord. | ... | 1½ — 1¾ |
| 1 | Do. 6% Cum. Pref. | ... | 1/16 — 1/8 |
| 100 | Do. 5% Mort. Debs. | ... | 91 — 96 |
| 1 | London and Suburban Trac. Co., Lim., Ord. | ... | 1/16 — 3/16 |
| 100 | London General Omnibus Company, Limited, 4½% Deb. | ... | 96 — 98 |
| 100 | Do. Do. 5% Cum. Inc. Deb. Stk. Red. | ... | 86 — 88 |
| 100 | London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red | ... | 59 — 63 |
| 100 | Madras Electric Trams. (1904), Lim., 6% Cum. Pref. | ... | 4¾ — 5¼ |
| 5 | Do. do. 5% Deb. Stk., Red. | ... | 101 —103 |
| 100 | Manaos Trys. & Ltg. Co., 5% 1st Debs., Red. | ... | 81 — 84 |
| $100 | Manila Electric R.R. and Lighting Corp. Capital Stk. | ... | 107 —110 xd |
| $1,000 | Do. 5% Bds. | ... | 96¼ — 98½ |
| 1 | Mansfield and Dist. Trys. Ltd. 6% Cum. Pref. | ... | 3/16 — 1 |
| 100 | Metropolitan Elec. Trms. Ltd., 4½% Deb Stock, Red. | ... | 82 — 86 |
| 100 | Do. 5% Deb. Stock, Red. | ... | 86 — 89 |
| 100 | Mexico Tramways Co., Common Stock | — 2 | 61 — 72 |
| 500 | Do. Gen. Con. 1st Mort. Gld. Bonds | ... | 77 — 82 |
| 100 | Do. 6% 50-yr. Mort. Bonds | + 2 | 80 — 83 |
| ... | Michigan United Railways 5% 1st Mort. Gld. Bonds | ... | 91 — 93 |
| 100 | Montreal Street Railway, Sterling 4½% Debs. (1922) | ... | 99 —101 |
| 100 | Do. 4½% Sterling Debs, (1922) | ... | 98 —100 |
| 1 | National Steam Car Co. Ltd. | — 3/32 | 3/32 — 5/32 |
| 10 | Oldham—Ashton and Hyde Elec. Ord. | ... | 5¼ — 6⅛ |
| 10 | Do. do. 5% Cum. Pref. | ... | 5⅜ — 6⅛ |
| 5 | Para Elec. Rlys. and Ltg. Co., Ord. | ... | 5¾ — 6¼ |
| 5 | Do. do. 6% Cum. Pref. | ... | 4½ — 5½ |
| 1 | Perth (W.A.) Elec. Trams., Ld., Ord. | ... | 1⅛ — 1⅜ |
| 1 | Potteries Electric Traction Co., Ltd., Ord. | ... | 3/16 — 5/16 |
| 1 | Do. 5% Cum. Pref. | ... | 1/16 — 1/8 |
| 100 | Do. 4½% Debenture Stock, Red. | ... | 84 — 87 |
| 1 | Provincial Tramways, Lim., Ord. | ... | 3/16 — 5/16 |
| 10 | Do. 5% 1st Deb. Stock | ... | 95 — 98 |
| ... | Puebla Tramway, Light & Power Co., Prior Lien 5% | ... | 82 — 85 |
| 5 | Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref. | ... | 5½ — 5⅝ |
| 100 | Do. do. 4½% 1st Mt. Db. Stk. | ... | 96⅛ — 98¼ |
| 100 | Rhondda Tramways Co., 5% 1st. Mt. Debs. | ... | 84 — 87 |
| $500 | Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds. | ... | 99¼ —101½ |
| 100 | Do. do. 5% 50-yr. Mort. Gold Bonds | ... | 90 — 92 |
| 10 | Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs. | ... | 97 —100 |
| $500 | Do. 5% 1st Mort. Debs., Red., 1929 | ... | 100 —103 |
| 10 | Shanghai Elec. Construction Co. | ... | 10 — 11 |
| 100 | Singapore Elec. Tramways Lim., 5% Debs. Red | ... | 86 — 90 |
| | South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. | ... | 5/16 — 7/16 |
| 100 | Do. do. 4% Deb. Stk. | ... | 68 — 72 |
| ... | Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs. | ... | 93 — 95 |
| 100 | Toronto Railway Co., 1st Mt. 4½% Sterling Bonds | ... | 97 — 99 |
| 100 | Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock | ... | 84½ — 86½ |
| 100 | Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk. | ... | 92 — 95 |
| 5 | United Elec. Tramways of Monte Video, Ord. | ... | 4½ — 5 xd |
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| 100 | Do. do. 5% 1st Deb. Stk. Red. | ... | 93½ — 96¼ |
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(REGISTERED AS A NEWSPAPER.)
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# The Tramway and Railway WORLD

ILLUSTRATED

A REVIEW OF PROGRESS IN Electric AND OTHER Traction.

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Borrowing Powers.
Borrowing Powers Exercised.
Unexhausted Borrowing Powers.
Capital Expenditure per mile of Single Track.
Loans Outstanding.
Sinking Fund and Loans Repaid.
Depreciation, Renewal and Reserve Funds.

**Gross Profit on Working.**

**Working Expenses**
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

**Gross Receipts :—**
Traffic.
Other Revenue.
Total.

**Deductions from Gross Profit :—**
Interest.
Sinking Fund.
Income Tax.
Depreciation and Renewals.
Sundries.
Total.

**Net Surplus or Deficit.**

**Appropriation of Net Surplus :—**
Carried Forward.
Reserve.
Relief of Rates.

**Percentage of Operating Expenses To Total Revenue.**

**Receipts per Car Mile :—**
Average Total per Car Mile.
Average Traffic Total per Car Mile.

**Operating Expenses per Car Mile :—**
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

**Average Operating Expenses per Car Mile (excluding Power Cost).**

**Board of Trade Units —**
No. of Units used.
Cost per Unit.
Units used per Car Mile.

**Traffic Records :—**
Population served.
Car Mileage.
Passengers Carried.
Passengers carried per Car Mile.
Average Fare per passenger.
Average Journeys per head of population served per annum.
Average Car Miles per Day per Car.
Traffic Revenue per Mile of Single Track.
Average Traffic Revenue per annum per head of population served
Operating expenses per passenger.
Average distance of 1d. fare.
Average fare charged per mile.
Average speed per hour.
Average Car hours per day.
Average number of Cars in use daily.
Number of cars in stock.


# Telegraphic Addresses and Telephone Numbers

## Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

| Name of Company or Firm. | Address. | Telegraphic Address. | Telephone No. |
|---|---|---|---|
| Ackley Brake Co. | 50, Church Street, New York City, U.S.A. | Acklebrak, New York | — |
| Ailsa Oilskin & Rubber Co. | Dalry, Ayrshire | Ailen, Dalry, Ayrshire | — |
| Allen & Co., Ltd., Edgar | Imperial Steel Works, Tinsley, Sheffield | Allen, Sheffield | 917, 268, Sheffield. |
| Allen & Co., Ltd., Edgar (Tramway Dept.) | Imperial Steel Works, Tinsley, Sheffield | Askham, Sheffield (Tramway and Machinery) | 213, Sheffield. |
| American Commerce Co., Ltd. | 19, St. Bride Street, London, E.C. | Amcomco London | 1508, Holborn. |
| Anger Manufacturing and Supply Co., Ltd. | Bank Chambers, Preston, Lancs. | Brakjuster, Preston | 1033, Preston. |
| Anglo Engraving Co., Ltd. | Milford Lane, Strand, London, W.C. | Operameter, London | 117, 8, 9, Gerrard. |
| Armstrong, Stevens & Son, Ltd. | Whittall Street, Birmingham | Armstrongs, Birmingham | 588, Birmingham. |
| Auto-Ticket Printing Co., Ltd. | 41, Wapping, Liverpool | Extension, Liverpool | 4646, Bank, Liverpool. |
| Aveling & Co. (B'ham), Ltd., T. C. | 91-3, New Canal Street, Birmingham | Aveling, Birmingham | 2939, Birmingham. |
| Avon India Rubber Co., Ltd. | Melksham, Wilts | Rubber, Melksham | 2, Melksham. |
| Babcock & Wilcox, Ltd. | 30, Farringdon Street, London, E.C. | Babcock, London | 6470 City (8 lines). |
| Bayliss, Jones & Bayliss, Ltd. | Victoria Works, Monmore Green, Wolverhampton | Bayliss, Wolverhampton | 45, Wolverhampton. |
| Belliss & Morcom, Ltd. | Ledsam Street Works, Birmingham | Belliss, Birmingham | 4480, Birmingham. |
| Bell Punch & Printing Co., Ltd. | 52-56, Tabernacle Street, London, E.C. | Osmic, London | 7531, Central. |
| Boydell & Sons, Ltd., W. | Brown Street Ironworks, Leigh, Lancs. | Boydell, Ironfounders, Leigh | 103, Leigh |
| Brecknell, Munro & Rogers, Ltd. | Thrissell Street, Bristol | Brecknell, Bristol | 3137 & 3138, Bristol. |
| Bridgeport Brass Co. | Broadway and Murray Street, New York, U.S.A. | — | — |
| Brill Co., J. G. | 110, Cannon Street, London, E.C. | Axles, London | 6018, Bank. |
| British Ackley Brake and Supply Co., Ltd. | Westinghouse Building, Norfolk Street, London, W.C. | Acklebrusa, London | 3272, Gerrard. |
| British Aluminium Co., Ltd. | 109, Queen Victoria Street, London, E.C. | Cryolite, London | 2676, City (3 lines). |
| British Berna Motor Lorries, Ltd. | Avonmore Road, West Kensington, London, W. | Klibergar, London | 4542, Western. |
| British Insulated & Helsby Cables, Ltd. | Prescot, Lancs | Insulator, Prescot | 8, Prescot. |
| British Thomson Houston Co., Ltd. | Rugby | Asteroidal, Rugby | 54, Rugby. 135, London Wall. |
| British Westinghouse Electric & Mfg. Co., Ltd. | Westinghouse Building, Norfolk Street, London, W.C | Multiphase, London | 3261 & 2476, Gerrard. |
| Brockhouse & Co., Ltd. | Victoria Works, Hill Top, West Bromwich | Brockhouse, West Bromwich | 228, West Bromwich. |
| Brush Electrical Engineering Co., Ltd. | Falcon Works, Loughborough | Falcon, Loughborough | 624, Loughborough. |
| Butcher & Co., J. H. | 506, Moseley Road, Birmingham | Solito, Birmingham | 383, South, Birmingham. |
| "Cedes" Electric Traction, Ltd. | 112, Great Portland Street, London, W. | Cedesmixte, Wesdo, London | 6130 Mayfair. |
| Clay & Atkinson | Bower Street, Bradford | — | 1263, Bradford. |
| Clayton & Co. (Huddersfield), Ltd. | Union Works, Huddersfield | Karriakar, Huddersfield | 1441, 2, 3, Huddersfield. |
| Clough, Smith & Co., Ltd. | Spencer House, South Place, London, E.C. | Clufmit, Ave., London | 8150, City. |
| Connolly, Ltd., J. W. & T. | Wharfdale Road, King's Cross, London, N. | Smiddy, London | 354, North. |
| Consolidated Accessories Co. | 27, Clement's Lane, London, E.C. | Inbrake, London | 5735, Central. |
| Continental Tyre and Rubber Co., Ltd. | Thurloe Place, London, S.W. | Pneumique, London | 4340, Kensington. |
| Courtenay, J. W., Ltd. | Amberley House, Norfolk Street, W.C. | Tramigro, London | 2946, Gerrard. |
| Curzon, Stuart A. | 98-100, Victoria Street, London, S.W. | Curcarseld, Sowest, London | 2043, Regent. |
| Dennis & Co., W. F. | 49, Queen Victoria Street, London, E.C. | Fredennis, London | 343, Bank (2 lines). |
| Dick, Kerr & Co., Ltd. | Abchurch Yard, Cannon Street, E.C. | Dicker, London | 6866, Bank (4 lines). |
| Decker Brothers, Ltd. | 1 & 2, New Street, Bishopsgate Street, E.C. | Matured, London | 2775, London Wall. |
| Doulton & Co., Ltd. | Lambeth Pottery, Lambeth, S.E. | Doulton, London | 2260, Victoria (5 lines). |
| Dryers, Ltd. | 53, Victoria Buildings, Manchester | Brownish, Manchester | — |
| Dunlop Rubber Co., Ltd. | Manor Mills, Aston, Birmingham | Elastic, Birmingham | 123, East, Birmingham. |

(Continued on page iv.)

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(Continued from page iii.)

# Telegraphic Addresses and Telephone Numbers

## Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

| NAME OF COMPANY OR FIRM. | ADDRESS. | TELEGRAPHIC ADDRESS. | TELEPHONE NO. |
|---|---|---|---|
| **Electric Construction Co., Ltd.** | Dashwood House, 9, New Broad Street, E.C. | Concordance, London | 2671, London Wall, and 10920 [Central |
| **Electro Mechanical Brake Co., Ltd.** | Eagle Works, Moor Street, West Bromwich | Brakes, West Bromwich | 291, West Bromwich. |
| **Equipment & Engineering Co.** | Westinghouse Building, Norfolk Street, London, W.C. | Kharparts, London | 3272, Gerrard |
| **Ettlinger Bros.** | South Molton Road, Victoria Docks, London, E. | Isolable, London | 320, East. |
| **Felten & Guilleaume, Carlswerk, A. G.** | Carlswerk, Mulheim-on-Rhine | Carlswerk, Mülheimrhein | — |
| **Ferranti, Ltd.** | Central House, Kingsway, London, W.C. | Ferranti, Westcent, London | 1602, Regent. |
| **General Electric Co., Ltd.** | 71, Queen Victoria Street, London, E.C. | Polyphase, London | 3600, London Wall. |
| **General Seating Co., Ltd.** | 13, City Road, London, E.C. | Cushioning, Finsquare, Lndn. | 6187, London Wall. |
| **Glasgow Numerical Printing Co.** | 81, Finnieston Street, Glasgow | Tickets, Glasgow | 5350, Glasgow |
| **Gleam, J. Barber** | Moorgate Station Chambers, London, E.C. | Octet, London | 263, London Wall. |
| **Green & Sons, Ltd., E.** | 2, Exchange Street, Manchester | Economiser, Manchester | 1275, Manchester. |
| **Grover & Co., Ltd.** | St. Peter's Street, Wharf Road, City Road, N. | Adopted, London | 617, North. |
| **Hadfield's Steel Foundry Co., Ltd.** | Hecla Works, Sheffield | Hadfield, Sheffield | 750, 2638, & 2639, Sheffield. |
| **Hailey's Industrial Motors, Ltd.** | Yoker, Glasgow | Horseless, Glasgow | 198 & 197, Clydebank. [Central |
| **Henley's Telegraph Works, Ltd.** | 13 & 14, Blomfield Street, London Wall, E.C. | Henletel, London | 4940, London Wall, and 2266. |
| **Hurst, Nelson & Co., Ltd.** | Motherwell, Scotland | Nelson, Motherwell | 44, Motherwell. |
| **Imperial Brake Block Co., Ltd.** | 1, Central Buildings, Tothill Street, S.W. | Millimodus, Ltd., London | 4189, Regent. |
| **International Pay-as-you-enter Tram. Co., Ltd.** | 6, Broad Street Place, London, E.C. | Pasentecar, London | 8876, Bank. |
| **International Time Recording Co.** | 151-155, City Road, London, E.C. | Timefactos, London | 1629, London Wall. |
| **Kalsbitum Paint Co.** | Belvedere Works, Belvedere, Kent | — | — |
| **Kearsley & Co., Ltd., Robt.** | Ripon, Yorks | Kearsley, Ripon | 5, Ripon. |
| **Leyland Motors, Ltd.** | Leyland, Lancs | Motors, Leyland | 7, Leyland. |
| **Lorain Steel Co.** | 34-36, New Broad Street, London, E.C. | Thoughtful, London | 8186, London Wall. |
| **Lubricators, Ltd.** | 59, Tollington Park, London, N. | Agreascup, London | 1786, North. |
| **M. and G. Truck and Engineering Co., Ltd.** | 88, John's House, 124-127, Minories, London, E. | Emgestock, London | 729, Avenue. |
| **Magnetic Anti-Friction Metal Co., Ltd.** | 49, Queen Victoria Street, London, E.C. | Magnolier, London | 6596, City. |
| **Major, Robinson & Co., Ltd.** | 213, Deansgate, Manchester | — | 5008, Central, Manchester. |
| **Maudsley Motor Co., Ltd.** | Parkside, Coventry | Maudsley, Coventry | 110, Coventry. |
| **Metropolitan Carriage, Wagon, and Finance Co., Ltd.** | Saltley, Birmingham | Metro., Birmingham | 6410, Central. |
| **Micanite & Insulators Co., Ltd.** | Empire Works, Blackhorse Lane, Walthamstow, E. | Mytilite, London | 38, Walthamstow. |
| **Millars' Timber and Trading Co., Ltd.** | Pinners' Hall, London, E.C. | Jarrah, London | 895, London Wall. |
| **Milnes-Daimler-Mercedes, Ltd.** | 123, Long Acre, London, W.C. | Milnesde, London | 8910, Gerrard. |
| **Mirrlees, Watson Co., Ltd.** | Scotland Street, Glasgow | Mirrlees, Glasgow | 1788, South Side. |
| **Moler Rail and Tram Car Co., Ltd.** | 79 Lombard Street, London, E.C. | — | 1777, Avenue. |
| **Moler Traction** | 20, Tudor Street, London, E.C. | Autocars, London | 3848, City. |
| **Municipal Tramways Association** | C. J. Spencer, 7, Hall Ings, Bradford | Tramways, Bradford | 2381 & 2382, Bradford. |
| **National Electric Construction Co., Ltd.** | 3, Laurence Pountney Hill, London, E.C. | Overhauled, London | 5329, Bank. |
| **Naylor Brothers (London) Ltd.** | 407, Oxford Street, London, W. | Glossiest, London | 926, Paddington. |
| **Peacock Brake Co.** | 27, Clement's Lane, London, E.C. | Inbrake, London | 5735, Central. |
| **Pearson, Huggins & Co., Ltd.** | Spencer House, South Place, London, E.C. | Tunicters, London | 22, London Wall. |
| **Penso & Partners, Ltd.** | 8, Eastcheap, London, E.C. | Fossicker, London | 2640, Avenue. |
| **Perkham Truck Co.** | Queen Anne's Chambers, London, S.W. | Quancham, London | 2413, Victoria. |
| **Peter Union Tyre Co.** | 129-129, Great Portland Street, London, W. | Pneapeter, London | 2433, Gerrard. |
| **Phillipson & Co., W.** | Holland Street, Astley Bridge, Bolton | Safety, Bolton | — |
| **Pinchin, Johnson & Co., Ltd.** | Minerva House, 26 & 27, Bevis Marks, London, E.C. | Pinchin, London | 9916, London Wall. |
| **Polack Tyre and Rubber Co., Ltd.** | 31-34, Basinghall Street, London, E.C. | Polackomp Ave., London | 5725, London Wall. |
| **R.E.T. Construction Co., Ltd** | Finsbury Pavement House, London, E.C. | Railiessly, Ave., London | 1384, London Wall. |
| **Railway & General Engineering Co., Ltd.** | Meadow Works, Nottingham | Dot, Nottingham | 10, Nottingham. |
| **Ruberoid Co., Ltd.** | 81-83, Knightrider Street, London, E.C. | Ruberoid, London | 1480, Central. |
| **Russell & Sons, Ltd., James** | Crown Tube Works, Wednesbury | Russell, Wednesbury | 2, Wednesbury. |
| **Scholey & Co., Ltd.** | 151, Queen Victoria Street, London, E.C. | Scolanco, London | 5863 & 5864, City. |
| **Senecaut, Robert** | 125, Rue des Boulets, Paris | — | — |
| **Shrewsbury & Challinor Tyre Co., Ltd.** | Kay Street, Ardwick Green, Manchester | Challiner, Manchester | 2900, Cntl., M'chstr. [Dalston. |
| **Siemens Brothers Dynamo Works, Ltd.** | Tyssen Street, Dalston, London, N.E. | Siemodyn, London | 8387-8389, Central, and 2460, |
| **Simplex Conduits, Ltd.** | Garrison Lane, Birmingham | Economy, Birmingham | 35, Victoria, Birmingham. |
| **Simplex Rubber Co., Ltd.** | Scrubbs Lane, Willesden, London, N.W. | Simplexine, London | 550, Willesden. |
| **Skefko Ball Bearing Co., Ltd.** | Skefko Works, Luton | Skefko, Luton | 418, Luton. |
| **Smith & Co., Frederick** | Anaconda Works, Salford, Manchester | Anaconda, Manchester | 2334, Manchester. |
| **Standard Underground Cable Co.** | Dock House, Billiter Street, London, E.C. | — | 5463, Avenue. |
| **Stevens, Ltd., W. A.** | 26, Victoria Street, London, S.W. | Petelobus, London | 4939, Victoria. |
| **Stewarts & Lloyds, Ltd.** | 41, Oswald Street, Glasgow | Lapweld, Glasgow | — |
| **Straker & Squire, Ltd., Sidney** | Nelson Square, Blackfriars, London, S.E. | Straquire, London | 369, Hop. |
| **Taylor, John** | 7, Strand Street, Liverpool | Velo, Liverpool | 4484 (Bank), Liverpool. |
| **"The Coventry" Chain Co., Ltd.** | Spon End Works, Coventry | Chains, Coventry | 830, Coventry. |
| **Thermit, Ltd.** | 27, Martin's Lane, Cannon Street, London, E.C. | Fulmen, Cannon, London | 4292, City. |
| **Ticket Punch and Register Co.** | 46, Queen Victoria Street, London, E.C. | Accompendo, London | 3332, City. |
| **Tilling, Ltd., Thomas** | Winchester House, Peckham, London, S.E. | — | 1209, Hop. |
| **Titan Trackwork Co., Ltd.** | Rutland Road, Sheffield | Crossings, Sheffield | 798 Central, Sheffield. |
| **Todd, R. R.** | 334, Birkbeck Chambers, High Holborn, London, W.C. | Neptubond, London | 3834, City |
| **Tramways and Light Railways Association** | Caxton House, Westminster, London, S.W. | — | 2110, Victoria. |
| **Tramway and Railway World** | Amberley House, Norfolk Street, W.C. | Tramigro, London | 2942, Gerrard. |
| **Tramway Supplies, Ltd.** | 160, Woodhouse Lane, Leeds | Controllers, Leeds | 3488, Central, Leeds |
| **Tudor Accumulator Co., Ltd.** | 129, Victoria Street, London, S.W. | Subconical, London | 3600, Victoria. |
| **Tyne Metal Co., Ltd.** | Skinnerburn Road, Newcastle-on-Tyne | Floating, Newcastle-on-Tyne | 2943, Newcastle. |
| **United Electric Car Co., Ltd.** | Preston, Lancs. | Prescar, Preston | 219 & 220, Preston |
| **Valor Co., Ltd.** | Rocky Lane, Aston Cross, Birmingham | Valor, Birmingham | 252 & 253 East, Birmingham. |
| **Walter Scott, Ltd.** | Leeds Steel Works, Leeds | Bessemer, Leeds | 510, Leeds. |
| **Warner International Engineering Co., Ltd.** | 5, Carteret Street, Westminster, London, S.W. | Birail, London | 5102, Victoria |
| **Watlington & Co., Ltd.** | Britannia House, 48, Milton Street, London, E. | Astnaco, Barb, London | 1257, City. |
| **Wells, A. C. & Co.** | 103-104, Midland Road, St. Pancras, London, N.W. | Unbreakable, London | 341, North. |
| **Westinghouse Brake Co., Ltd.** | York Road, King's Cross, London, N. | Westinghouse, London | 2416, North. [Central. |
| **White & Co., J. G.** | 9, Cloak Lane, Cannon Street, London, E.C. | Whitterick, London | 3306, London Wall, and 9686 |
| **Williamson, Alfred** | North Mill Printing Works, Ashton-under-Lyne | — | 220, Ashton-under-Lyne. |
| **Wilson Rolling Shutter Co.** | St. John's House, 124 to 127, Minories, London, E. | Shurolter, London | 729, Avenue. |
| **Winter & Co., E.** | 64, Cheapside, London, E.C. | Similative, London | 985, Central. |
| **Wiseman, Ltd., Alfred** | Glover Street, Birmingham | Verus, Birmingham | 99, Victoria, Birmingham. |
| **Wolf & Co., S.** | 115, Southwark Street, London, S.E. | Widerstand, London | 5172, Central, and 2734, Hop. |
| **Worthington Pump Co., Ltd.** | 153, Queen Victoria Street, London, E.C. | Steampump, London | 301, 302 & 303, Bank |
| **Yorkshire and Lincolnshire Tar Distillation Co.** | Standard Buildings, Leeds | Creosote, Leeds | 4504, Central, Leeds |
| **Youngs** | Ryland Street Works, Birmingham | Oldens, Birmingham | 301, Midland. |

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Offices: AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.
Telegrams: "TRAMIGRO, LONDON,"
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# The Tramway and Railway WORLD

ILLUSTRATED

A REVIEW OF PROGRESS IN Electric AND OTHER Traction.

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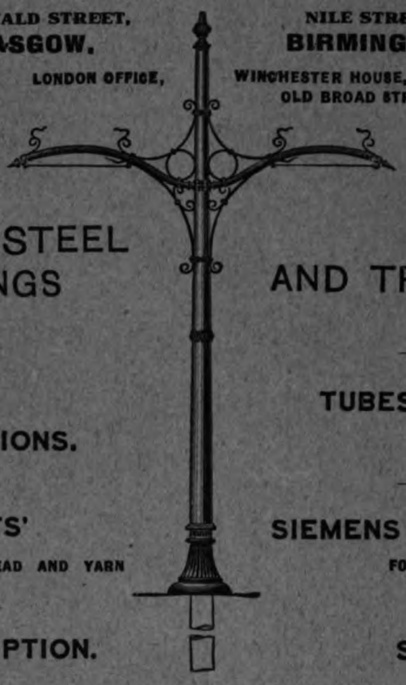

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# Telegraphic Addresses and Telephone Numbers

## Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

| NAME OF COMPANY OR FIRM. | ADDRESS. | TELEGRAPHIC ADDRESS. | TELEPHONE No. |
|---|---|---|---|
| Ackley Brake Co. | 50, Church Street, New York City, U.S.A. | Acklebrak, New York | — |
| Ailsa Oilskin & Rubber Co. | Dalry, Ayrshire | Ailsa, Dalry, Ayrshire | — |
| Allen & Co., Ltd., Edgar | Imperial Steel Works, Tinsley, Sheffield | Allen, Sheffield | 917, 365, Sheffield. |
| Allen & Co., Ltd., Edgar (Tramway Dept.) | Imperial Steel Works, Tinsley, Sheffield | Askham, Sheffield (Tramway and Machinery) | 213, Sheffield. |
| Alphons Custodis Chimney Construction Co. | 119, Victoria Street, London, S.W. | Custodomus, London | 779, Victoria. |
| Anger Manufacturing and Supply Co., Ltd. | Bank Chambers, Preston, Lancs. | Brakjuster, Preston | 1033, Preston. |
| Anglo Engraving Co., Ltd. | Milford Lane, Strand, London, W.C. | Operameter, London | 117, 8, 9, Gerrard. |
| Armstrong, Stevens & Son, Ltd. | Whittall Street, Birmingham | Armstrongs, Birmingham | 588, Birmingham. |
| Auto-Ticket Printing Co., Ltd. | 41, Wapping, Liverpool | Extension, Liverpool | 4646, Bank, Liverpool. |
| Avon India Rubber Co., Ltd. | Melksham, Wilts | Rubber, Melksham | 2, Melksham. |
| Babcock & Wilcox, Ltd. | 30, Farringdon Street, London, E.C. | Babcock, London | 5540, Holborn (4 lines). |
| Bayliss, Jones & Bayliss, Ltd. | Victoria Works, Monmore Green, Wolverhampton | Bayliss, Wolverhampton | 25, Wolverhampton. |
| Belliss & Morcom, Ltd. | Ledsam Street Works, Birmingham | Belliss, Birmingham | 4480, Birmingham. |
| Bell Punch & Printing Co., Ltd. | 52-58, Tabernacle Street, London, E.C. | Osmic, London | 7581, Central. |
| Berna Commercial Motors, Ltd. | Avonmore Road, West Kensington, London, W. | Klibergar, London | 4548, Western. |
| Boydell & Sons, Ltd., W. | Brown Street Ironworks, Leigh, Lancs. | Boydell, Ironfounders, Leigh | 103, Leigh |
| Brecknell, Munro & Rogers, Ltd. | Thrissell Street, Bristol | Brecknell, Bristol | 3137 & 3138, Bristol. |
| Bridgeport Brass Co. | Broadway and Murray Street, New York, U.S.A. | — | — |
| Brill Co., J. G. | 110, Cannon Street, London, E.C. | Axles, London | 6018, Bank. |
| British Ackley Brake and Supply Co., Ltd. | Westinghouse Building, Norfolk Street, London, W.C. | Acklebrusa, London | 3272, Gerrard. |
| British Aluminium Co., Ltd. | 109, Queen Victoria Street, London, E.C. | Cryolite, London | 4315, London Wall. |
| British Insulated & Helsby Cables, Ltd. | Prescot, Lancs. | Insulator, Prescot | 9, Prescot. |
| British Thomson Houston Co., Ltd. | Rugby | Asteroidal, Rugby | 54, Rugby. 136, London Wall. |
| British Westinghouse Electric & Mfg. Co., Ltd. | Westinghouse Building, Norfolk Street, London, W.C. | Multiphase, London | 3261, Gerrard. |
| Brockhouse & Co., Ltd. | Victoria Works, Hill Top, West Bromwich | Brockhouse, West Bromwich | 228, West Bromwich. |
| Brush Electrical Engineering Co., Ltd. | Falcon Works, Loughborough | Falcon, Loughborough | 624, Loughborough. |
| Butcher & Co., J. H. | 506, Moseley Road, Birmingham | Solito, Birmingham | 383, South, Birmingham |
| "Cedes" Electric Traction, Ltd. | 112, Great Portland Street, London, W. | Cedesmixte, Wesdo, London | 6130 Mayfair. |
| Clay & Atkinson | Bower Street, Bradford | — | 1963, Bradford. |
| Clough, Smith & Co., Ltd. | Spencer House, South Place, London, E.C. | Clufmit, Ave., London | 8150, City. |
| Connolly, Ltd., J. W. & T. | Wharfdale Road, King's Cross, London, N. | Smiddy, London | 354, North. |
| Consolidated Accessories Co. | 27, Clement's Lane, London, E.C. | Inbrake, London | 5735, Central. |
| Continental Tyre and Rubber Co., Ltd. | Thurloe Place, London, S.W. | Pneumique, London | 4340, Kensington. |
| Courtenay, J. W., Ltd. | Amberley House, Norfolk Street, W.C. | Tramigro, London | 2948, Gerrard. |
| Coventry Chain Co., Ltd. | Spon End Works, Coventry | Chains, Coventry | 830, Coventry |
| Dennis & Co., W. F. | 49, Queen Victoria Street, London, E.C. | Fredennis, London | 343, Bank. |
| Dick, Kerr & Co., Ltd. | Abchurch Yard, Cannon Street, E.C. | Dicker, London | 5867, Bank. |
| Docker Brothers, Ltd. | 1 & 2, New Street, Bishopsgate Street, E.C. | Matured, London | 2775, London Wall. |
| Dodson, Christopher, Ltd. | 81, Page Street, Westminster, London, S.W. | Ceedolim, London | 3633, Victoria. |
| Doulton & Co., Ltd. | Lambeth Pottery, Lambeth, S.E. | Doulton, London | 2260, Victoria |
| Dryers, Ltd. | 53, Victoria Buildings, Manchester | Brownish, Manchester | — |
| Dunlop Rubber Co., Ltd. | Manor Mills, Aston, Birmingham | Elastic, Birmingham | 123, East, Birmingham. |

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(Continued from page iii.)

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| NAME OF COMPANY OR FIRM. | ADDRESS. | TELEGRAPHIC ADDRESS. | TELEPHONE NO. |
|---|---|---|---|
| Electric Construction Co., Ltd. | Dashwood House, 9, New Broad Street, E.C. | Concordance, London | 2671, London Wall. |
| Electro Mechanical Brake Co., Ltd. | Eagle Works, Moor Street, West Bromwich | Brakes, West Bromwich | 291, West Bromwich. |
| Equipment & Engineering Co. | Westinghouse Building, Norfolk Street, London, W.C. | Kharparts, London | 3272, Gerrard. |
| Estler Bros. | South Molton Road, Victoria Docks, London, E. | Isolable, London | 320, East. |
| Felten & Guilleaume, Carlswerk, A. G. | Carlswerk, Mulheim-on-Rhine | Carlswerk, Mülheimrhein | — |
| Ferranti, Ltd. | Central House, Kingsway, London, W.C. | Ferranti, Westcent, London | 1602 & 1603, Regent. |
| General Electric Co., Ltd. | 71, Queen Victoria Street, London, E.C. | Polyphase, London | 3600, London Wall. |
| General Seating Co., Ltd. | 13, City Road, London, E.C. | Cushioning, Finsquare, Lndn. | 6187, London Wall. |
| Glasgow Numerical Printing Co. | 31, Finnieston Street, Glasgow | Tickets, Glasgow | 5350, Glasgow |
| Glenn, J. Barber | Moorgate Station Chambers, London, E.C. | Octet, London | 262, London Wall. |
| Green & Sons, Ltd., E. | 2, Exchange Street, Manchester | Economiser, Manchester | 1375, Manchester. |
| Grover & Co., Ltd. | St. Peter's Street, Wharf Road, City Road, N. | Adopted, London | 617, North. |
| Hadfield's Steel Foundry Co., Ltd. | Hecla Works, Sheffield | Hadfield, Sheffield | 750, 2638, & 2638, Sheffield. |
| Hailey's Industrial Motors, Ltd. | Yoker, Glasgow | Horseless, Glasgow | 196 & 197, Clydebank. [Central |
| Henley's Telegraph Works, Ltd. | 13 & 14, Blomfield Street, London Wall, E.C. | Henletel, London | 4940, London Wall, and 8696. |
| Hurst, Nelson & Co., Ltd. | Motherwell, Scotland | Nelson, Motherwell | 44, Motherwell. |
| Imperial Brake Block Co., Ltd. | 29, Great St. Helens, London, E.C. | Millimodus, London | 759, Avenue. |
| International Pay-as-you-enter Tram. Co., Ltd. | 6, Broad Street Place, London, E.C. | Pasentecar, London | 8376, Bank. |
| International Time Recording Co. | 151-155, City Road, London, E.C. | Timefactos, London | 2965, London Wall. |
| Kalbitum Paint Co. | Belvedere Works, Belvedere, Kent | — | — |
| Kearsley & Co., Ltd., Robt. | Ripon, Yorks | Kearsley, Ripon | 5, Ripon. |
| Leyland Motors, Ltd. | Leyland, Lancs | Motors, Leyland | 7, Leyland. |
| Lorain Steel Co. | 36-38, New Broad Street, London, E.C. | Thoughtful, London | 8186, London Wall. |
| Lubricators, Ltd. | 59, Tollington Park, London, N. | Agreascup, London | 1786, North. |
| M. and G. Truck and Engineering Co., Ltd. | St. John's House, 124-127, Minories, London, E. | Emgestock, London | 739, Avenue. |
| Magnolia Anti-Friction Metal Co., Ltd. | 49, Queen Victoria Street, London, E.C. | Magnoliet, London | 6596, City. |
| Major, Robinson & Co., Ltd. | 213, Deansgate, Manchester | — | 5002, Central, Manchester. |
| Maudslay Motor Co., Ltd. | Parkside, Coventry | Maudslay, Coventry | 110, Coventry. |
| Metropolitan Carriage, Wagon, and Finance Co., Ltd. | Saltley, Birmingham | Metro., Birmingham | 6410, Central. |
| Micanite & Insulators Co., Ltd. | Empire Works, Blackhorse Lane, Walthamstow, E. | Mytilite, London | 33, Walthamstow. |
| Millars' Timber and Trading Co., Ltd. | Pinners' Hall, London, E.C. | Jarrah, London | 368, London Wall. |
| Milnes-Daimler-Mercedes, Ltd. | 132, Long Acre, London, W.C. | Milnesie, London | 6910, Gerrard, & 8821, Central. |
| Mirrlees, Watson Co., Ltd. | Scotland Street, Glasgow | Mirrlees, Glasgow | 1783, South Side. |
| Motor Rail and Tram Car Co., Ltd. | 79 Lombard Street, London, E.C. | — | 1777, Avenue. |
| Motor Traction | 20, Tudor Street, London, E.C. | Autocars, London | 6720, Holborn. |
| Municipal Tramways Association | C. J. Spencer, 7, Hall Ings, Bradford | Tramways, Bradford | 2381 & 2382, Bradford. |
| National Electric Construction Co., Ltd. | 3, Laurence Pountney Hill, London, E.C. | Overhauled, London | 3329, Bank. |
| Naylor Brothers (London) Ltd. | 407, Oxford Street, London, W. | Glossiest, London | 926, Paddington. |
| Peacock Brake Co. | 27, Clement's Lane, London, E.C. | Inbrake, London | 5755, Central. |
| Pearson, Huggins & Co., Ltd. | Spencer House, South Place, London, E.C. | Tunicians, London | 92, London Wall. |
| Pease & Partners, Ltd. | 8, Eastcheap, London, E.C. | Fossicker, London | 2640, Avenue. |
| Peckham Truck Co. | Queen Anne's Chambers, London, S.W. | Quanchan, London | 2413, Victoria. |
| Peter Union Tyre Co. | 190-192 Great Portland Street, London, W. | Pneupeter, London | 2433, Gerrard. |
| Philipson & Co., W. | Holland Street, Astley Bridge, Bolton | Safety, Bolton | — |
| Pinchin, Johnson & Co., Ltd. | Minerva House, 26 & 27, Bevis Marks, London, E.C. | Pinchin, London | 2916, London Wall. |
| Polack Tyre and Rubber Co., Ltd. | 31-34, Basinghall Street, London, E.C. | Polackomp, London | 5697, City. |
| R.E.T. Construction Co., Ltd | Finsbury Pavement House, London, E.C. | Raillessly, Ave., London | 1384, London Wall. |
| Railway & General Engineering Co., Ltd. | Meadow Works, Nottingham | Dot, Nottingham | 19, Nottingham. |
| Ruberoid Co., Ltd. | 81-83, Knightrider Street, London, E.C. | Ruberoid, London | 1480, Central. |
| Russell & Sons, Ltd., James | Crown Tube Works, Wednesbury | Russell, Wednesbury | 2, Wednesbury. |
| Scholey & Co., Ltd. | 151, Queen Victoria Street, London, S.W. | Scolanco, London | 5963, City. |
| Senecaut, Robert | 125, Rue des Boulets, Paris | — | — |
| Shrewsbury & Challiner Tyre Co., Ltd. | Kay Street, Ardwick Green, Manchester | Challiner, Manchester | 3800. Cntl., Manchstr. [Dalston, |
| Siemens Brothers Dynamo Works, Ltd. | Tyssen Street, Dalston, London, N.E. | Siemodyn, London | 8387-8389, Central, and 2440, |
| Simplex Conduits, Ltd. | Garrison Lane, Birmingham | Economy, Birmingham | 35, Victoria, Birmingham. |
| Skefko Ball Bearing Co., Ltd. | Skefko Works, Luton | Skefko, Luton | 418, Luton. |
| Smith & Co., Frederick | Anaconda Works, Salford, Manchester | Anaconda, Manchester | 2334, Manchester. |
| Standard Underground Cable Co. | Dock House, Billiter Street, London, E.C. | — | 1414, Central. |
| Stevens, Ltd., W. A. | 96, Victoria Street, London, S.W. | Petelobus, London | 4939, Victoria. |
| Stewarts & Lloyds, Ltd. | 41, Oswald Street, Glasgow | Lapweld, Glasgow | — |
| Straker & Squire, Ltd., Sydney | Nelson Square, Blackfriars, London, S.E. | Straquire, London | 369, Hop. |
| Taylor, John | 7, Strand Street, Liverpool | Velo, Liverpool | 4484 (Bank), Liverpool. |
| "The Coventry" Chain Co., Ltd. | Spon End Works, Coventry | Chains, Coventry | 830, Coventry. |
| Thermit, Ltd. | 27, Martin's Lane, Cannon Street, London, E.C. | Fulmen, Cannon, London | 3749, Central. |
| Ticket Punch and Register Co. | 44, Queen Victoria Street, London, E.C. | Accompendo, London | 3383, City. |
| Titan Trackwork Co., Ltd. | Rutland Road, Sheffield | Crossings, Sheffield | 798 Central, Sheffield. |
| Todd, R. R. | 334, Birkbeck Chambers, High Holborn, London, W.C. | Neptubond, London | 3834, City |
| Tramways and Light Railways Association | Carton House, Westminster, London, S.W. | — | 2110, Victoria. |
| Tramway and Railway World | Amberley House, Norfolk Street, W.C. | Tramigro, London | 2948, Gerrard. |
| Tramway Supplies, Ltd. | 160, Woodhouse Lane, Leeds | Controllers, Leeds | 3488, Central, Leeds. |
| Tudor Accumulator Co., Ltd. | 119, Victoria Street, London, S.W. | Subcomical, London | 2600, Victoria. |
| Tyne Metal Co., Ltd. | Skinnerburn Road, Newcastle-on-Tyne | Floating, Newcastle-on-Tyne | 2943, Newcastle. |
| United Electric Car Co., Ltd. | Preston, Lancs. | Prescar, Preston | 219 & 220, Preston. |
| Valor Co., Ltd. | Rocky Lane, Aston Cross, Birmingham | Valor, Birmingham | 252 & 253 East, Birmingham. |
| Walter Scott, Ltd. | Leeds Steel Works, Leeds | Bessemer, Leeds | 510, Leeds. |
| Warner International Engineering Co., Ltd. | 5, Carteret Street, Westminster, London, S.W. | Birail, London | 5102, Victoria. |
| Watlington & Co., Ltd. | Britannia House, 43, Milton Street, London, E. | Aetnaco, Barb, London | 1201, City. |
| Wells, A. C. & Co. | 103-104, Midland Road, St. Pancras, London, N.W. | Unbreakable, London | 341, North. |
| Westinghouse Brake Co., Ltd. | York Road, King's Cross, London, N. | Westinghouse, London | 2416, North. [Central. |
| White & Co., J. G. | 9, Cloak Lane, Cannon Street, London, E.C. | Whitterick, London | 3306, London Wall, and 9886 |
| Williamson, Alfred | North Mill Printing Works, Ashton-under-Lyne | — | 220, Ashton-under-Lyne. |
| Wilson Rolling Shutter Co. | St. John's House, 124 to 127, Minories, London, E. | Shurolter, London | 6416, Central. |
| Winter & Co., E. | 64, Cheapside, London, E.C. | Similative, London | 965, Central. |
| Wiseman, Ltd., Alfred | Glover Street, Birmingham | Verus, Birmingham | 99, Victoria, Birmingham. |
| Wolf & Co., S. | 115, Southwark Street, London, S.E. | Widerstand, London | 5172, Central. |
| Worthington Pump Co., Ltd. | 153, Queen Victoria Street, London, E.C. | Steampump, London | 301, 302 & 303, Bank |
| Yorkshire and Lincolnshire Tar Distillation Co. | Standard Buildings, Leeds | Creosote, Leeds | 4504, Central, Leeds. |
| Youngs | Ryland Street Works, Birmingham | Oldens, Birmingham | 301, Midland. |

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